Rubber Journal and International Plastics

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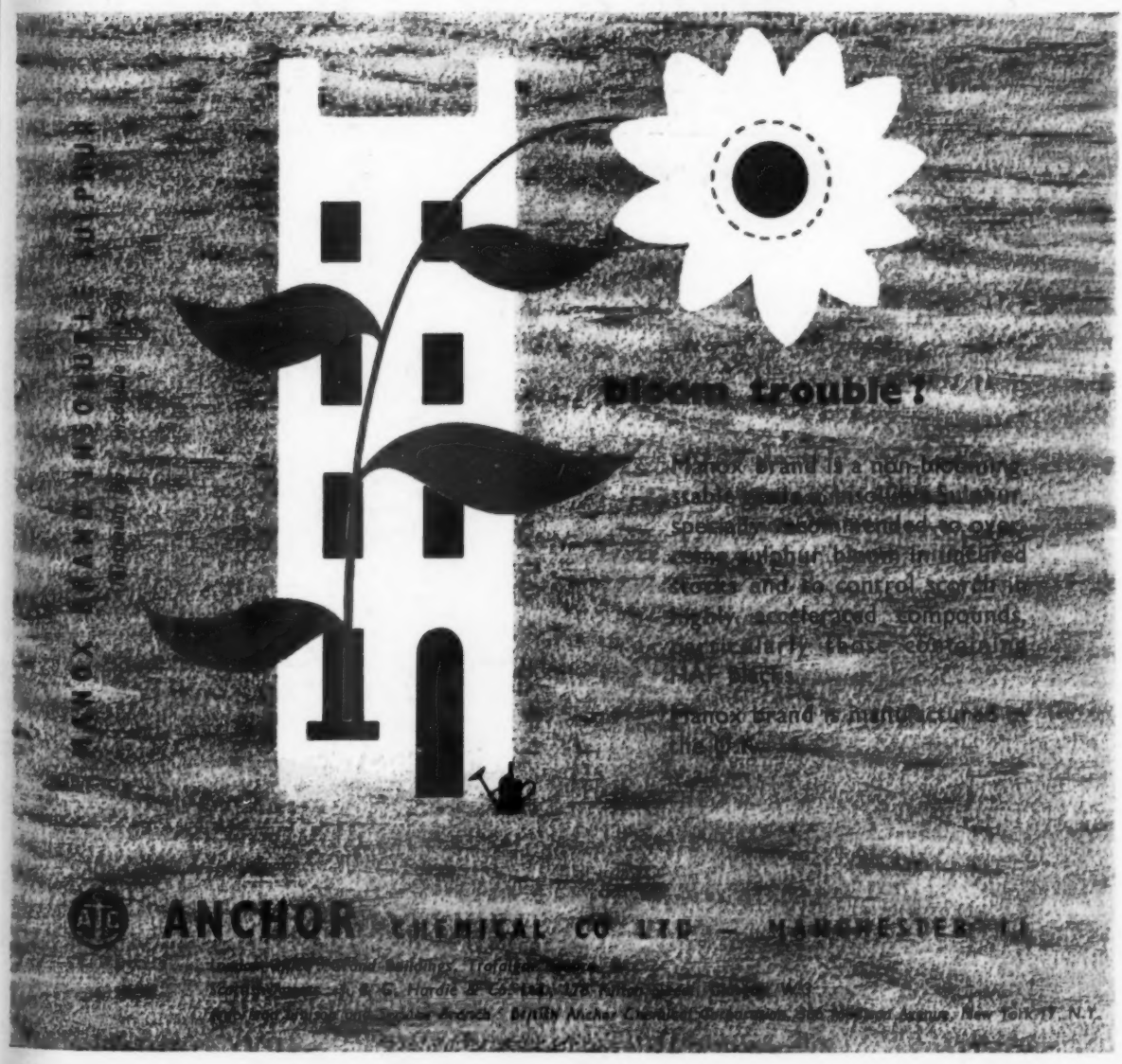
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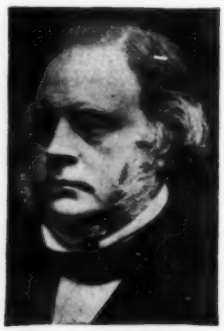

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IN ITS 75th YEAR

May 30 1959

Editorial

NOTES OF THE WEEK 811

Articles and News

MILLROOMS, MASTICATION AND MIXING 814
A SURVEY OF POLYMERS 817
CEYLON ASSOCIATION IN LONDON 818
CAREERS IN RUBBER 819
RADIAL COMPRESSION 820
INTERNATIONAL PLASTICS EXHIBITION 832
HOT-WATER BOTTLE ACTION 832

Features

NEWS BRIEFS 812
VIEWS AND REVIEWS 822
QUESTIONS CORNER 826
MEN AND MATTERS 828
COMPANIES IN THE NEWS 833
REVIEWS 833
PLANTATION COMMENTARY 834
RUBBER STATISTICS 838
PATENT SPECIFICATIONS 840
RUBBER AND PLASTICS STOCK MARKET 841
RUBBER MARKETS 842
INDUSTRY INTELLIGENCE 843
TRADE MARKS 844

Classified Advertisements . . . 845 Advertisers Index . . . 848

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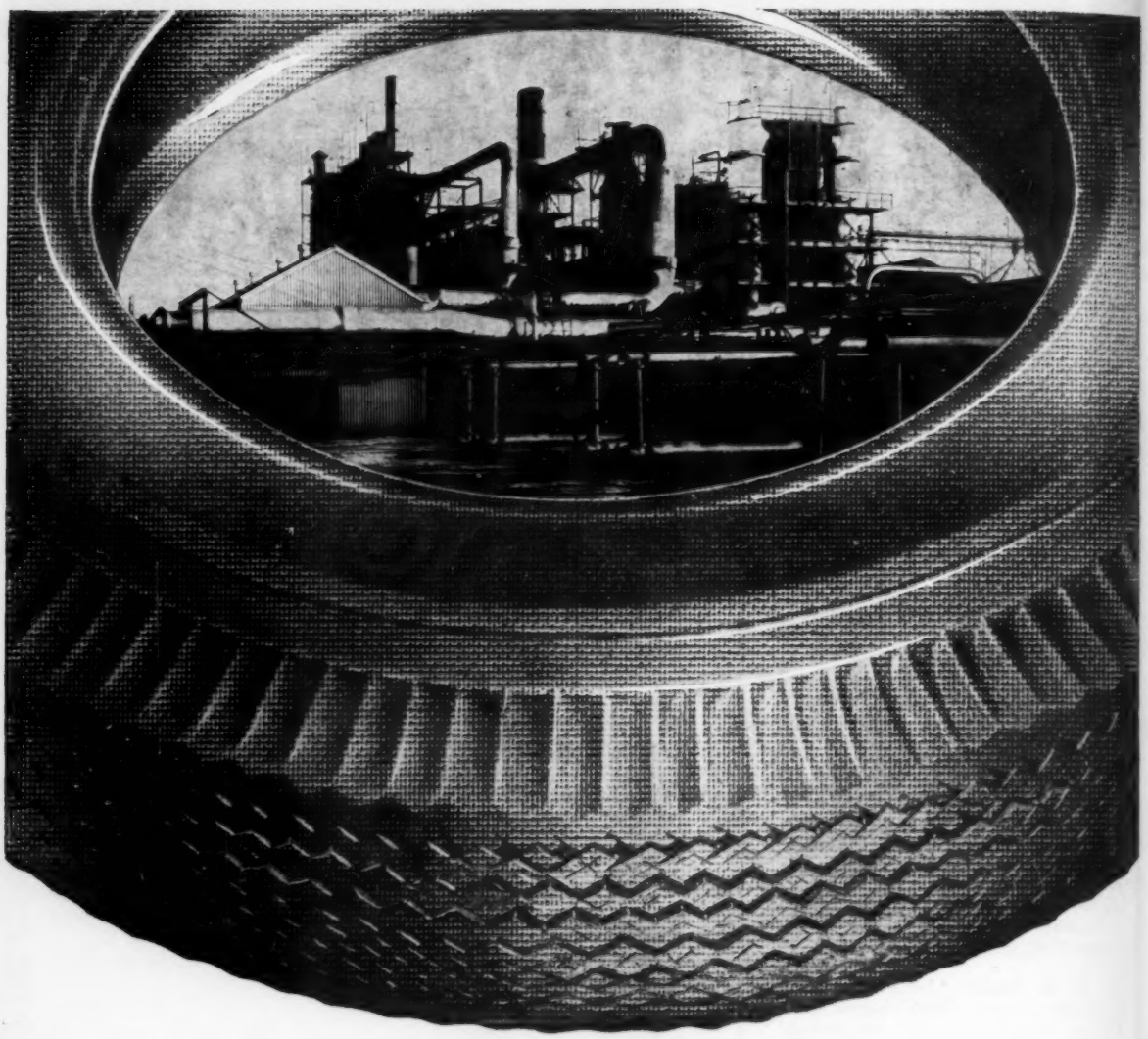

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NOTES of the WEEK

College of Technologists

AS part of the drive to meet the increasing need for technologists, the National Council for Technological Awards was set up in 1955; its purpose was to create and administer awards for students in technical colleges. The Council now offers a first award, the Diploma in Technology, which is equivalent in standard to an honours degree of a British university. Last November the Council announced its proposal to create the higher award of membership of the College of Technologists in order to encourage qualified men and women to undertake further study beyond the level of the Diploma in Technology and carry out original investigations. The achievement of that objective is now measurably nearer with the establishment, announced last week by the governing body of the National Council for Technological Awards, of the College of Technologists. The College will administer the award of membership of the College of Technologists (MCT) which the National Council propose to create as a qualification higher than the Diploma in Technology. The Council's stated intention is that this award shall be a mark of outstanding distinction granted to a student who has proved his ability by completing a substantial programme of work demanding the application of his knowledge to the solution of a problem of value to industry. The establishment of such an award should prove of value, ultimately, to many industries and a fine spur to personal endeavour.

RABRM Rivals

RUBBER research conducted by United States Senators might seem either something of the stuff that dreams are made of or, more down to earth, that some members of the Senate were setting up in opposition to the Research Association of British Rubber Manufacturers. However, according to a statement in the Senate by Senator Proxmire, reported in the *Congressional Record* for May 14, he and several others have conducted skid tests on rubber floor tiles laid in the new Senate Office Building. To quote, '. . . yesterday we conducted some exhaustive tests on these floors and found them to be absolutely skidproof. The Senator from Illinois tried to skid on them. So did I. We have some excellent skidders in our office, yet we found we could not skid at all.' The tests resulted from argument in the Senate over rubber tile versus carpet. 'Rubber,' said one Senator, produced sounds akin to 'the noisy chatter of blackbirds.' Senator Proxmire held that the tiles were not only quiet and skidproof, but beautiful: besides, they saved $750 per room. He read also from a telegram he had received from the manufacturer, whose amusing, and to the point, remarks concluded with: 'Frankly, it amazes me that there are some Senators, normally talkative, who at last don't want " to take the floor ".'

Careers Exhibition

ROYAL recognition of the value of the work performed for the industry by the Federation of British Rubber and Allied Manufacturers—and of the opportunities for careers within the industry—was given when, on Wednesday, the Queen and Prince Charles visited the FBRAM stand at the Education and Careers Exhibition currently at Olympia. Her Majesty was welcomed by Mr Jasper Frankenburg, president of the Federation. The stand is proving one of the most popular at the exhibition. It illustrates effectively and comprehensively the many aspects of the industry and is so arranged that there is something of interest to most of the age groups attending. The Natural Rubber Development Board has contributed towards the cost of mounting the exhibits. The exhibition, which opened on Tuesday, remains open until June 5.

Plastics Sales

FINAL figures for 1958 show that the main expansion in plastics sales during the year was again, and not unexpectedly, in thermoplastics, with the largest increase in polythene and with sales in acrylics, polystyrene and PVC also substantially up. Thermosetting plastics figured at about the same level as in 1957. Also notable is the fact that polyesters continued to expand rapidly, reaching a total about 48% above that for 1957. The increase in PVC is of particular interest. It points the fact that the challenge from Japan is now causing less anxiety—following upon Japanese manufacturers' moves to limit exports to the US and European markets. Some uncertainty about prices must, however, remain. Growing competition is to some extent reflected in the decreased expansion rate of 6%, compared to 17% for 1957. Exports, encouragingly, were up by some 9% on the previous year, reaching a record 34,000 tons in the last quarter.

NEWS *Briefs*

CANADIAN FIRESTONE EXPANSION — US VINYL PLANT — CEYLON/CHINA TRADE — VENEZUELAN LABOUR DISPUTE — ITALIAN POLYPROPYLENE

●**Ceylon**—In discussions with the visiting Peking trade delegation it has been generally agreed that China will supply Ceylon with 250,000 tons of rice this year in exchange for 30,000 tons of rubber. It is expected that a firm agreement with China will be signed shortly in Colombo.

●**Dominica**—The first factory in the Dominican Republic to manufacture plastics electrical conduit, water pipes, plastics table ware and medical equipment is to begin production in Ciudad Trujillo shortly. Machinery and equipment have been imported from the US.

●**Malaya**—The rubber industry in Kuala Lumpur is taking an interest in the West Australian 'guayule' rubber-growing project. According to reports reaching Malaya from Australia, 20 test areas in the State are to be planted with the guayule shrub, which, it is claimed, is capable of producing 10 million lb. of latex a year from 10,000 acres. A spokesman for the Malayan Rubber Producers' Council said the Council was interested in the Australian project, but was not unduly concerned about it. By the time West Australia started to produce rubber on a commercial scale, he said, demand would also have risen. An official of the United Planting Association of Malaya said: 'The world market for both natural and synthetic is increasing and probably guayule will help meet demands.' A spokesman for the National Union of Plantation Workers said Malaya had no cause to worry over developments in the rubber industry elsewhere. 'We produce quality rubber,' he said.

●**Italy** — Commercial production of polypropylene textile fibres will begin in Italy at the end of this year according to information released by Dr Piero Giustiniani, managing director, Montecatini Soc. Gen., Milan. Initial price for the staple on the Italian market will be equivalent to about 60 US cents per lb.

●**Venezuela**—The Venezuelan Minister of Labour, Senor Luis Hermandez Solis, is trying to find an amicable solution to a threatened strike by employees of General Caucho, the largest tyre company in Caracas. Recently the union at General Caucho presented grievances and said they would strike in 120 hours if their demands were not met. The walk-out has not yet materialized due to intervention by the Labour Minister.

●**Australia**—Mr T. Wayne Brewster, the project director of B. F. Goodrich (Australia) Proprietary Ltd., said last week that his firm hoped to start production of a new tyre before the end of the year. It would be the first Australian tyre to be made entirely from synthetic rubber.

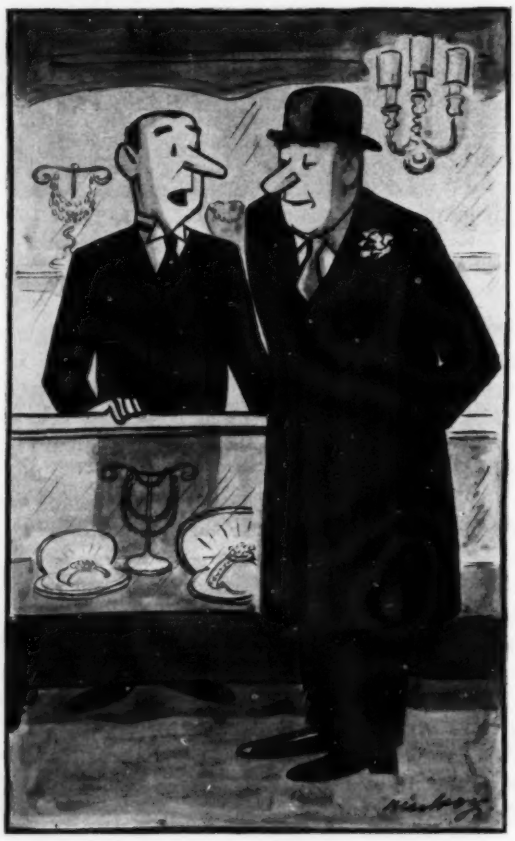
●**United States** — Johns-Manville Corp. will start construction immediately of a new plant at Chillicothe, Ohio, to manufacture vinyl plastic and asphalt floor tiles. The plant, which will cost several million dollars, will expand floor tile output by over 33%, according to Mr A. R. Fisher, chairman and president. Expansion later may include facilities for other building materials, Mr Fisher added. Completion of the new plant, the company's thirty-fourth, is scheduled for the summer of 1960.

●**Canada** — T. M. Mayberry, president of Firestone Tire and Rubber Company of Canada, has announced plans to establish a new tyre manufacturing plant in Western Canada. The new plant, Mr Mayberry said, is part of an $8m. to $10m. expansion programme of the company which also includes additions and improvements to the present Hamilton, Ontario, installation.

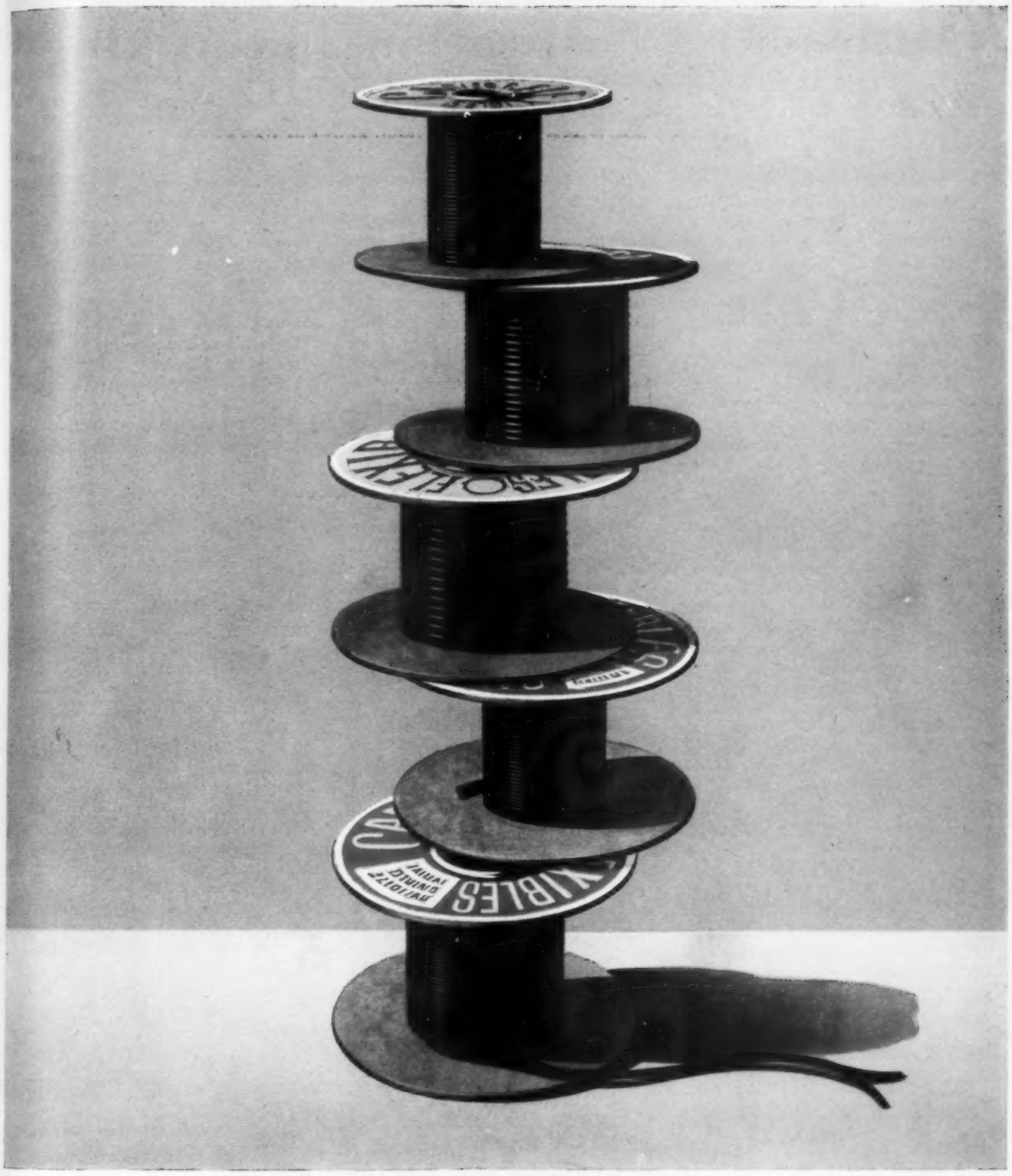
HAPPY BIRTHDAY

Birthday greetings to Mr H. H. S. Hillier (London and Provincial Rubber Co. Ltd.) for June 2; Mr P. J. Franklin (J. G. Franklin and Sons Ltd.) and Mr E. P. Rydings (Zama Ltd.) June 9; Mr R. F. Holden (Poppe Rubber and Tyre Co. Ltd.) June 12; Mr A. Johnston (Research Association of British Manufacturers) and Mr A. E. Oates (British Resin Products Ltd.) June 15; Mr A. J. Stubbs (Head of Research Section, Dunlop Research Centre) June 16; Mr M. S. Welling (British Geon) June 17; F. E. Winstanley (Greengate and Irwell Rubber Co. Ltd.) June 21; Mr P. D. Patterson (Development Division, Dunlop Research Centre) June 23; Mr Mario E. Puritz (Rubber Improvement Ltd.) June 24; Mr K. Blake June 27; Mr A. Speedy (Columbian International (Great Britain) Ltd.) June 28.

∴ *Duly authenticated dates for inclusion in this feature will be welcomed by the Editor.*



'Wedding rings, sir? Yes sir—gold, white gold, platinum or rubber?'—441



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Millrooms, Mastication and Mixing

RABRM SYMPOSIUM

PEPTIZERS, lambs, dispersions, daffodils, mastication, deer, Shropshire folk-lore, Sputniks and mill room productivity. This sounds rather a queer mixture, but those of us who were lucky enough to attend the symposium on 'Millrooms, Mastication and Mixing,' arranged by the Research Association of British Rubber Manufacturers at the Shropshire Adult College at Attingham Park on April 20-23, made contact with all the above subjects, although they were not all on the agenda! The number of subjects concerning the rubber industry discussed and the thousands of pounds of compounded rubber and varied products produced at the sessions in the 'basement' bar were impressive.

Attingham House was, until 1947, the home of Lord Berwick, who shortly before his death bequeathed his stately home and the estate to the National Trust. Lady Berwick continues to live in a portion of the house, but most of the building has been leased to the Governors of the Shropshire Adult College as a residential centre for adult education. Courses are run on a large variety of subjects and RABRM have found that as this hall at Atcham is less than ten miles from Shawbury it provides an ideal setting for their symposia. There is already keen competition for these meetings, and those who were too late to apply for the course just held would be wise to reserve their place for the repeat performance to be held later in the year.

The first to welcome us at Attingham was Sir George Trevelyan, Bt., M.A., who is the Warden of the College, and who, I am sure all those on the course will admit, fills this office with remarkable aptitude. One wonders whether there is any subject under the sun upon which Sir George cannot discourse after 'listening-in' on such a variety of lectures held in the magnificent room which was formerly the old dining room of the house. The colour scheme is a bold 'Pompeian red' which is relieved with white and gold designs. It is said that Pompeii was just being excavated at the time the hall was built, 1783-87, and the colour chosen was that found in some of the dwellings exposed after hundreds of years. We were also told that this colour scheme was chosen for the dining room for its soporific effect on the diners to enhance the results of the festive board. However, as far as is known, none of the lectures had this drastic effect on those attending the course.

Astronautics

The first planned session on Monday evening, after dinner, was a lecture by Mr A. L. Soden, B.Sc., of RABRM, on astronautics or flights into the realms of space. The lecturer, who is a Fellow of the British Interplanetary Society, gave us a much clearer picture than most of us possessed on the numerous man-made missiles and satellites that have been launched and are in orbit. Interesting theories were discussed concerning the lack of gravitational force in outer space. It was a most interesting talk and served to make us think more on the subject and also to bring us together as a group for the really serious business of the symposium on the following day.

Mastication

On the Tuesday morning Dr W. F. Watson, the Director of Research at RABRM, welcomed us to Attingham and then gave us a lecture on 'The Theory of Mastication.' This was a survey of the history of the subject; of Hancock, who in about 1820 discovered that his rubber became tacky and was softened when worked by mechanical means.

The work done by Staudinger, Kauzman, Eyring, Cotton, and Busse was also described, and that done by Pike and Watson in 1952 at the British Rubber Producers' Research Association on the subject of cold and hot mastication processes. Dr Watson did imply that the term 'peptizer' used so freely by the rubber technologist and millroom staff was a somewhat colloquial term and that it should be more exactly classed as a radical acceptor. We feel that most of us will still opt for 'peptizer.'

The second lecture of the day was given by Mr J. R. Pyne, A.I.R.I., on 'Mastication using Peptizers: Roll Mills and Small Mixers.' In this talk he gave us a most comprehensive introduction to the subject of peptizers and their use, showing how mastication times could be cut to obtain a required plasticity and giving us an

A group of delegates who attended the RABRM Symposium at Attingham Park

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OVERSEAS AGENTS THROUGHOUT THE WORLD

P.2208

idea of the cost in comparison to the time and power saved to achieve this. The work done on various peptizers at RABRM was analysed and their respective costs and performances tabulated for our benefit. To the production man or technologist working in conjunction with the works to increase productivity this was a most interesting lecture.

After lunch on Tuesday, as a relief from lectures, we were shown round the mansion by the Deputy Warden, Mr R. Chaplin, M.A. This again was a most interesting tour and by now most of us were beginning to feel that we were almost inhabitants at Attingham.

Millroom and Drugroom

The 3.45 p.m. lecture by Mr T. J. Daniel, B.Sc., Grad.Inst.P., was entitled 'Millroom and Drugroom Arrangement.' This was a general talk on the advisability of a good layout for the crude stores, drugroom and millroom to avoid unnecessary movement of raw materials, weighed out batches and mixed compound in order to obtain maximum productivity. It was also stressed that the order of stocks in the drugroom layout should correspond to the order on the compound formula card, as far as possible, to help the batch weigher. The positioning of the bale cutter near the batch weighing section was also advocated.

Again a lecture of practical use. We had still not finished for the day. At 6 p.m., Dr W. C. Wake, M.Sc., Ph.D., F.R.I.C., F.I.R.I., gave us as his subject 'Mastication in Larger Internal Mixers' This was, in effect, a continuation of the talk by Mr Pyne on the subject of mastication, but dealt exclusively with the conditions and improvements to be gained by the use of peptizers in large internal mixers. It was shown how by proper investigation and planning of a process, factories could obtain the best productivity from their internal mixers.

Dr Wake also stressed that the plasticity testing of *all* masticated batches was *not* necessary if the laboratory found that the results were consistently satisfactory. Some of those attending were perhaps misled to think that this referred to laboratory testing in general, but the emphasis was on plasticity testing and this is a reasonable assumption.

On Wednesday morning the first lecture was given by Mr G. N. Welding, M.A., B.Sc., A.R.I.C., A.P.I., of the National College of Rubber Technology. The subject was 'The Mechanism of Mixing on Roll Mills.'

This talk, with the help of slides and a film, showed the movements which occur in a bank of rubber in the nip of a two-roll mill. It was demonstrated by adding colour or bits of confetti to the rubber of the front roll before it entered the nip. It was also shown how necessary it was to cut and fold a batch on a mill during mixing to avoid a 'dead layer' of unblended materials and rubber adjacent to the surface of the front roll. Experiments carried out on some modified methods of mixing on two-roll mills on a production scale had so far not proved really successful.

Mr Daniel gave the next lecture on 'Internal Mixers, One and Two Stage Mixing.' This talk gave a comparison of outputs obtained at a number of factories and also gave particulars of how the speed of rotors and the horsepower of the internal mixer had increased in the last 40 years.

During this lecture we were shown some interesting diagrams of the mill and drugroom layout of the Russian tyre factory now being fitted out by British enterprise. Some pertinent questions were asked concerning this, but we have no wish to extend the 'cold war'!

Productivity and Investment

Dr Wake then talked to us on 'Productivity and Investment.' This was a study for those who wanted more plant and were trying to persuade the board that this was really necessary! The financial wizards of the gathering had some awkward questions to ask Dr Wake.

Our final lecture was on the subject of 'The Importance of Dispersion and Its Estimation.' This was given by Mr C. H. Leigh-Dugmore, B.Sc., A.Inst.P., A.I.R.I., of the Dunlop Research Centre. He described a microtome-microscopic means of testing carbon black masterbatches for dispersion. I quote directly from Mr Leigh-Dugmore's notes: 'Dispersion is a combination of disaggregation and distribution'; 'disaggregation is the separation of particles from each other'; 'distribution is the spreading of particles throughout the rubber'; 'dispersion should be improved until disaggregation seems complete'; 'perfect distribution is never achieved; efforts to reach it are usually wasted.'

Most of us were perhaps rather surprised to hear the implication that dispersion was not as important as we were led to believe. The proofs that the lecturer gave us appeared fairly conclusive and quite a few of us may have to change our ideas on the subject.

Visit to RABRM

We concluded our stay at Attingham by having a cocktail party and dinner under the chairmanship of Mr J. W. Denson of the Goodyear Company at Wolverhampton. This proved a most enjoyable occasion and was a fitting finale to the proceedings. Most of us did, however, visit RABRM on Thursday morning to see various demonstrations such as the use of peptizers on roll mills, rapid plastimetry in the millroom, and the measurement of carbon black dispersion as described by Mr Leigh-Dugmore in his lecture.

At the end of the three-day course we all felt that it had been well worth it, and especially as the weather had been so kind to us. The surroundings for such a gathering proved an ideal setting. RABRM and all those concerned in the running of the course are to be congratulated on the way it was organized and conducted.

—E. P. B. E.

The high quality finish of the glass fibre reinforced plastic wash-tub illustrated is clearly shown. Produced by Microcell Ltd., at Camberley, on a 250-ton hydraulic press, it is a component of a Vactric washing machine. It is interesting to note that whereas the metal-type wash-tub is subject to temperature losses of up to 30°F. per hour, the glass fibre reinforced plastic tub suffers only a 3°F. loss on average over a similar period. This is based on water temperature of 190°F.

A Survey of Polymers

OCCA CONFERENCE

(Concluded from May 23 issue, page 776)

A PAPER on 'Some Aspects of Polyurethane Chemistry,' was given by H. Gudgeon and R. J. W. Reynolds. Chemistry of polyurethanes was closely bound with that of the isocyanates, and depended on the use of bifunctional isocyanates or reactive intermediates or these products of higher functionality. Reactions of the isocyanate (NCO) group could be summarized as:

(*a*) $R.NCO + R'OH \rightarrow R.NH.COOR'$

(*b*) $R.NCO + R'NH_2 \rightarrow R.NH.CONHR'$

(*c*) $RNCO + R'COOH \rightarrow RNHCOR' + CO_2$

(*d*) $R.NCO + H_2O \rightarrow RNH_2 + CO_2$, $RNH_2 \rightarrow RNHCONHR$

Secondary reactions could be illustrated as:—

$$-RNHCOR- + -R'NCO \rightarrow -RNCOR- \quad (CONHR')$$

Materials reacting with isocyanates were themselves often polymeric. Urethane groups were only introduced where reactive groups were hydroxyl. Other groupings gave rise to amide, urea, biuret and allophane links.

Isocyanates were formed by reactions of phosgenes with amines or their hydrochlorides, toluene diisocyanate isomers being often used, but in this case the .NCO group in the p-position is 7 times more reactive than the corresponding ortho derivative. Another mixture was based on diaminodiphenyl methanes, which were less volatile than the toluene isocyanates. Reactivity of isocyanates varied with different groups, *e.g.*, aliphatic amines, primary alcohols, water, amides, but environmental effects and catalysts could modify reactivity.

Reaction with phenols gave aryl urethanes which dissociated at about 150°C to give original components, thus providing a low toxicity intermediate. Another type of addition compound designed to reduce toxic hazard was obtained by reacting with a triol, *e.g.* hexane triol, which produced a trireactive isocyanate of low volatility. R.C. $(CH_2OOCNHRNCO)_3$ was obtained by reacting a diisocyanate (3 parts) with one of triol. Dimers and trimers of diisocyanates were known and were also capable of further reaction.

A polymer fibre based on 1 : 4 butanediol and hexamethylene diisocyanate had been used for bristle applications (Perlon U).

Linear polyester elastomers had been reacted with 1 : 5 naphthalene diisocyanate to give lightly cross linked, highly elastic products of high tensile strength, and resilience, and excellent abrasion resistance. This was illustrated by Bayer 'Vulkollan'.

'Vulcaprene A' was prepared by reacting a linear polyesteramide from ethylene glycol, monoethanolamine and adipic acid of MW c 5,000 with hexamethylene diisocyanate to form a 'raw rubber' which could be cured on conventional rubber machinery with a formaldehyde liberating agent, and also in solution with further diisocyanate. Oil resistance and resistance to oxidative ageing were a feature of the cured polymer rather than mechanical properties. For some purpose non crystallizing polyesters could be used, including compositions of diisocyanates with castor oil.

Polymers containing some hydroxyl groups with a little dissolved water were used for flexible foams. A slightly branched polyester of MW 1,500-2,000 was favoured and polypropylene glycols and hydroxyl ended polyethers obtainable by polymerization of tetrahydrofuran had also been used. Densities of as low as 2 lb. per cu. ft. could be obtained.

Rigid foams were obtained similarly from highly branched polyesters. As they were made without heat they could be formed *in situ*, *e.g.* cavities in ships, as insulating materials. The use of diphenylmethane diisocyanates was favoured as reducing toxicity risks in enclosed spaces.

Simple, branched polyesters mixed with diisocyanates have been mixed and used either by air drying or stoving at 150°C. for surface coatings. Pot lives were rather short. Lightly branched polyesters gave soft elastic films of excellent adhesion and gloss. The more branched polyesters were more solvent resistant, and could be used for wear resistant wood lacquers, and for chemical plant protection.

On the subject of general chemical reactivity and processing, the authors said that much data was still required on relative reactivity, gelling times, etc. In some cases tertiary amines were of advantage in catalyzing reactions. Retardation of reactions without deleterious side effects still awaited further work.

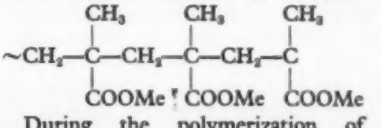
Very careful control was necessary in making products such as cellular polyurethanes in order to obtain optimum properties. In particular the addition of surface active agents (aqueous type) seemed necessary. The wide variety of resins used in this series caused a wide range of physical properties of polyurethane rubbers to be possible. Thus in polyurethane rubbers based on polypropylene adipate, crystallization set in at a low elongation (50%), accounting for high tensile strength. Rubber/glass transition could be lowered by increasing aliphatic segments in the chains. Permeability to water could vary widely, and must be controlled by correct use of polyester.

The wide variety of products possible using isocyanates, and the ease of *in situ* reactions was providing products with an ever increasing number of applications.

Synthetic Resin Deterioration

A paper on the chemistry of the deterioration of synthetic resins was given by Dr. N. Grassie. The chemistry of rubbers, resins and fibres, was similar as far as consideration of deterioration was applicable. Reaction of a single repeating unit in a chain of several thousand units could result in a very large decrease in molecular weight and of desirable properties. Equally, if a reaction resulted in cross linking, a rigid structure might be built up with loss of desirable properties. Heat, light, oxygen and radiation could all affect plastic materials, either during fabrication or subsequent use.

Heat could cause a 'zipper mechanism' of degradation, *e.g.* polymethyl methacrylate at temperatures above 200°C. lost radical ends one by one, forming long chain radicals



During the polymerization of methyl methacrylate the growing radicals were destroyed by reaction in pairs, so that half had unsaturated terminal groups. 50% of any polymethyl methacrylate decomposed thermally at 220°C., this containing the unsaturated groups, whilst the residue

was at least 70°C. more stable. Control of chain ends could influence stability.

Visible and U.V. radiation in absence of oxygen produced cross linking in polymers containing active hydrogen. X-rays, γ-rays and neutrons acted on a wider variety of materials. If the radicals first formed by the radiation were resonance stabilized, *e.g.* rubber or polystyrene, there was a tendency to cross linking. Unstabilized radicals such as polymethyl methacrylate or polyethylene usually produced decomposition. Slight cross linking, as in vulcanization of rubber tends to 'anchor' the molecules, giving toughness and a wide temperature range of usefulness, and therefore controlled radiation crosslinking may be of interest.

Oxygen was particularly effective with light, which produced radicals which reacted with oxygen to produce peroxy radicals, which abstracted a hydrogen from elsewhere to continue the chain. This was the classic hydroperoxidation chain process.

Initiation $RH \rightarrow R\cdot + H\cdot$

Propagation $\begin{cases} R\cdot + O_2 \rightarrow RO\cdot_2 \\ RO\cdot_2 + RH \rightarrow ROOH + R\cdot \end{cases}$

The hydroperoxides had a primary mode of decomposition by rupture of the oxygen/oxygen bond.

$$\sim\!\overset{|}{\underset{|}{C}}\!\sim \rightarrow \sim\!\overset{|}{\underset{|}{C}}\!\sim + \cdot OH$$

(OOH on the left C, O· on the right C)

The oxyradical RO· was much more likely to undergo scission than the simple R·, and thus could cause softening of rubber.

Colour was usually caused by unsaturated groups such as C=O, C=C, C=N, colour varying from yellow to red according to number and type of these groups. P.V.C. decomposition was caused by loss of HCl, but once a double bond was formed, the hydrogen was activated, and a zipper mechanism was set up.

$$\sim H_2\text{—}CHCl\text{=}CH\text{—}CH_2\text{—}CHCl\sim$$

Stabilizers for chloro resin included those such as esters of maleic and fumaric acids, which acted by a Diels-Alder mechanism on conjugated systems and prevented a build-up of 'zipper' reactions. Light absorbents such as carbon black or selective u.v. absorbents such as certain salicylates were used as stabilizers.

Substances reacting with HCl acted as stabilizers, provided that they could not strip HCl from the polymer. (This section aroused considerable discussion and it was suggested that lead salts acted as inhibitors of free radical formation rather than absorbers of HCl).

Trace impurities which could enter a polymer, or chain branches, had a very marked effect. Thus carbonyl groups in polyethylene, and tertiary hydrogens acted as centres of fission. Colouration in methacrylonitrile could be avoided by not using peroxides for polymerization and avoiding the monomer containing traces of methacrylic acid or proton donating substances.

Questions involving drying oils were not dealt with in the subsequent discussion, Dr Grassie preferring to confine his lecture to synthetic resins of which he had experience, but he referred to the excellent PRS work on the subject.

Ceylon Association in London

REPORT FOR 1958

THE report of the Ceylon Association in London for 1958 contains as usual a great deal of information and useful statistics. It records a slight fall in acreages represented by plantation companies and estates, rubber acreage being down from 84,390 in 1957 to 81,271 in 1958.

The total area under rubber in December 1957 was as follows:

	No. of Holdings or Estates	*Total Acreage*
Smallholdings below 10 acres	131,843	184,510
Estates 10 acres and above but below 100 acres	5,848	154,422
Estates 100 acres and above but below 500 acres	664	151,509
Estates 500 acres and above	193	170,284
	138,548	660,725

The island's rubber was owned at December 1957 as under:

	Acres	*Per cent.*
Ceylonese (including rupee companies)	553,454	83.8
Sterling companies ..	90,559	13.7
Others	16,712	2.5
	660,725	100.0

Comprised in these acreages were 441,638 acres of ordinary seedling rubber and 219,087 acres of high-yielding budded or clonal rubber. With regard to the latter figure, it is noted that this includes 40,000 acres planted during 1939-45 principally by smallholders, and that most of these new plantations have so deteriorated that they can no longer be classed as high-yielding. The true acreage of h.y. rubber is therefore about 175,000.

The replanting subsidy fund sufficed for the financing of approximately 22,000 acres, although the final details are not yet known. This brings to about 122,000 acres the total area replanted under the scheme for the first six years of its operation. The rate of replanting in Ceylon, measured as a percentage of the island's total rubber area, is still the highest of any rubber-producing country in the world.

The annual cost of the Rubber Replanting Scheme from 1958 onwards is estimated at approximately Rs.20m. of which Rs.15m. is provided by economic aid from China under the 1958-62 trade agreement with that country and the balance of about Rs.5m. from Treasury funds. Effect is given to these financial arrangements in the Rubber Replanting Subsidy (Amendment) Act No. 5 of 1958.

The average monthly prices per lb. for RSS No. 1 during 1958 varied between 1s. 9$\frac{1}{16}$d. (May) and 2s. 1$\frac{7}{8}$d. (November) on the London market and between 80 cents (May) and 112.7 cents (November) in Colombo.

The average price for the year (*i.e.* the average of daily prices) was 1s. 11$\frac{1}{2}$d. per lb. on the London market as compared with 2s. 2$\frac{3}{32}$d. for 1957, and 93.5 cents in Colombo as compared with 115.7 cents for 1957.

The rates of freight on rubber during the year were as follows: Colombo to the United Kingdom: 177s. 6d. per 40 cu. ft. less 10% deferred commission. Colombo to United States North Atlantic Ports: $40.50 per 40 cu. ft.

The Report notes that indiscipline among labour on estates increased during the year but the number of strikes on estates amounted to 121 against 177 in 1957. The basic wages of rubber estate workers remained unchanged during 1958, the daily figure for male workers being Rs.2.58.

Members on the roll of the Association at December 31 1958 numbered 600, comprising 113 plantation companies and estates, 17 agency houses, 43 miscellaneous firms and 427 private members.

Mr R. C. Hubball has been appointed a director of the Bukit Sembawang Rubber Co. and of Singapore United Rubber Plantations.

Careers in Rubber

FBRAM AT CAREERS EXHIBITION

IT is clear, from the high standard of the exhibits at the National Education and Careers Exhibition (Olympia, May 26–June 5) that industry in general realizes the great importance of attracting recruits. It must be likewise a source of pride to the rubber industry that the stand of the Federation of British Rubber and Allied Manufacturers is probably the outstanding exhibit at the Exhibition.

Extremely effective from the point of view of schoolboys and, surprisingly, of schoolgirls, is the 'trial of strength' machine designed especially for the occasion by J. H. Fenner and Co. Ltd. This machine illustrates the great strength of modern rubber to metal bonding. Up to the time of going to press the record appears to be held by a small schoolgirl of some 11 years who stepped up to the machine and pulled the pointer round to maximum with no visible effort.

A panel detailing the opportunities existing in the rubber industry covers a number of different occupations ranging from production and purchasing through to process control, research and engineering to personnel, plantations, product design and development.

An effective panel illustrates the extent to which industry in general relies on rubber. Aspects illustrated include rubber in use in nuclear protection, chemical plant linings, conveyor belts, anti-vibration mountings, hose and packaging.

Another effective display illustrated the production of natural rubber, ranging from latex collection to the arrival of smoked sheet at London docks. An adjoining panel outlined the progress of the synthetic rubber industry in the UK and included details of the ISR plant at Hythe.

Other items calculated to attract the attention of visitors to the exhibition included one of the tyres that won the world land speed record; details of the boat that won the water speed record; photographs of rubber equipment and jet aircraft; under-water swimming equipment; Arctic equipment; Everest equipment; photographs of rocket and railway equipment and the uses of rubber in agriculture.

The FBRAM stand was visited on Wednesday by Her Majesty the Queen and Prince Charles who showed great interest in every detail.

The excellence of the FBRAM exhibit was widely commented on and congratulations are due to E. S. H. Janes, chairman of the Federation publicity committee responsible for organizing the exhibits and to A. A. Maw whose services were loaned by the Dunlop Company and who designed the stand. One of the most notable aspects was the degree of co-operation from companies in the industry who seem to have rallied very well to the cause of education and recruitment. The Natural Rubber Development Board also contributed to the stand which represents a very fine combined effort.

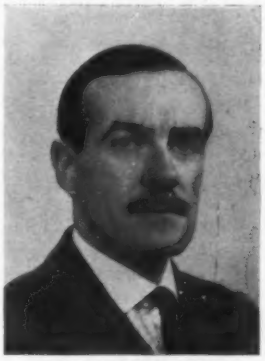
IFC Tyre Symposium

The Symposium of tyres organized by the Institut Français du Caoutchouc, and held in Paris last week, proved extremely successful. More than 200 delegates attended of whom some 100 were from 16 foreign countries. Papers and the discussions which followed aroused great interest. Reports will appear in next week's issue of *RJIP* and in succeeding issues.

The Indonesian Government on Monday instructed foreign-owned, or part foreign-owned, business firms to register with district authorities within 30 days, the Antara News Agency reports.

DUNLOP APPOINTMENT

Mr D. J. Flunder has been appointed general purchasing manager for the Dunlop Rubber Company, and



D. J. FLUNDER

will in future be in charge of the materials supply division. Since October 1957 Mr Flunder has been London manager of Dunlop Plantations Ltd.

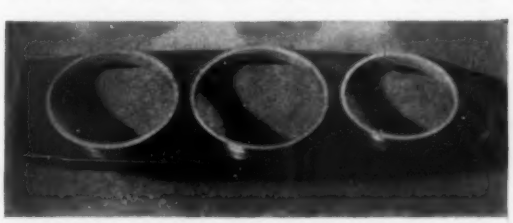
'Steel-Shaw' Exhibition

Steele and Cowlishaw Ltd., one of the Baker Perkins group of companies, will hold their own special exhibition at the Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham 2, from June 9 to 13. The exhibition will be open from 9 a.m. until 9 p.m. except on Saturday, June 13, when it will open at 9 a.m. and close at noon. Exhibits will include the 'Steel-Shaw' high speed ball mills, Mark I and V, the 'Steel-Shaw' Kady kinetic dispersion mill and the 'Quickway' paint conditioner.

I.C.I. 'Fluon' Prices Reduced

IMPERIAL Chemical Industries Ltd. has reduced the prices of its 'Fluon' polytetrafluoroethylene. The average cost of 'Fluon' granular polymer since March 1956 has been about £2 a lb. The new prices represent, in general, reductions of 13%. 'Fluon' granular polymer was first sold at around £5 a lb. in 1948. Increased output has made possible price reductions to the present level.

Its ability to withstand chemical attack and its good insulating qualities have made 'Fluon' an attractive material for the chemical and electrical industries, while other applications have developed from its remarkable 'non-stick' properties. It has a wider working temperature range than any other plastics material. I.C.I. Plastics Division's 'Fluon' range now includes granular polymer for moulding and extrusion, coagulated dispersion polymer for extrusion and dispersions for a wide variety of applications.



I.C.I. 'Fluon' PTFE bearings for the rotor blades of the Fairey Rotodyne aircraft. Made by Mills Pressure Filled Joint Rings Ltd., Bridgwater

Radial Compression

THE EFFECT OF LOW TEMPERATURES ON RUBBER PACKING RINGS

By P. G. MORGAN

THE magnitude of the contact force at the surface of a packing ring with the metal surface of a rotating shaft is one of the main factors determining the sealing qualities of the ring. Little has been known of the effect of temperature upon the contact force and some recently reported Russian work [1] on the effects of low temperature is therefore of interest. When the temperature falls below 0°C. there is a greater shrinkage of the rubber ring than of the corresponding metal part, due to the different coefficients of expansion. As a result, the compression decreases and the contact force between the rubber ring and the metal surface is reduced, but this decrease is only a small part of the total reduction, which is mainly due to the loss of elasticity with reduced temperature.

Beyond a certain temperature, which depends upon the composition of the rubber, there is a practically linear decrease in the radial force.

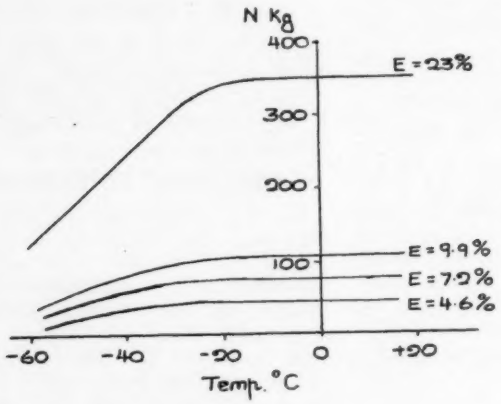


Fig. 1

The effect of the degree of comparison is shown in Figs. 1 and 2, which give the approximate proportionality between the contact force N and the compression percentage E. When cooling occurs, the temperature at which the contact force decreases rapidly does not depend on the degree of compression. Moreover, the decrease in force ΔN is proportional to E, so that the temperature at which a given proportion of the radial force $\frac{N}{N_{20°}}$ is retained (Fig. 2) is practically independent of E.

The shape of the N–T curve and its approximate independence of the degree of deformation is similar to that of the relation between the loss of elasticity of the rubber with the fall in temperature. This is also independent of the degree of deformation. It appears that when the temperature of crystallization is reached, the rubber loses its resilience, so that shrinkage is a decisive factor below this temperature.

The effect of temperature on the relative value of the radial force has been studied for rings made of the same rubber but of different cross sections, *i.e.* round, rectangular and U-shaped. Fig. 3 shows that the first two produce the same effect; U rings are less dependent upon temperature due to the deflection which can occur.

The work may be summarized by saying that the cooling of rubber seals brings about a decrease in radial force, the amount depending upon the initial compression. The relative change in force is independent of the degree of deformation of the compressed seals, which indicates the primary role of the loss of high elasticity. Gaskets which seal by deflection lose a considerably smaller proportion of their radial force than square or round section rings.

[1] Nosov, Y. A., and Ratner, S. B., *Zh. Tekn. fiz* (1958), **28**, 7, p. 1448.

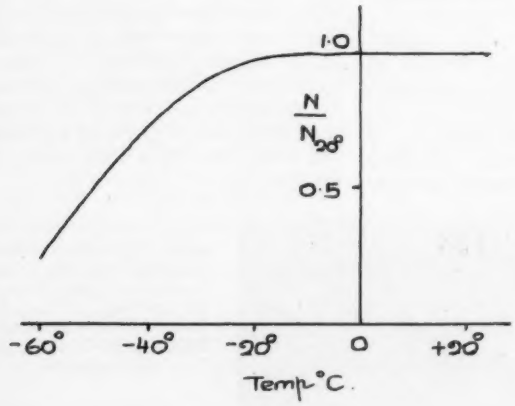


Fig. 2

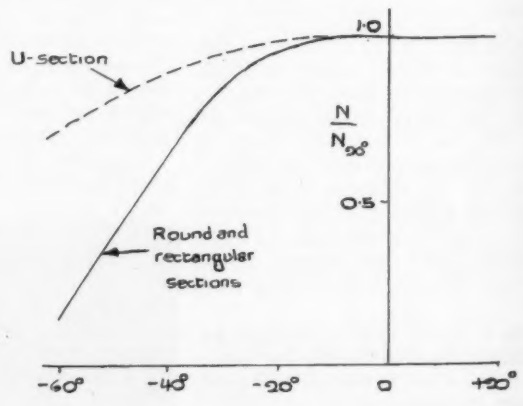


Fig. 3

A vital link in Bridge-Banbury Automation — Special purpose

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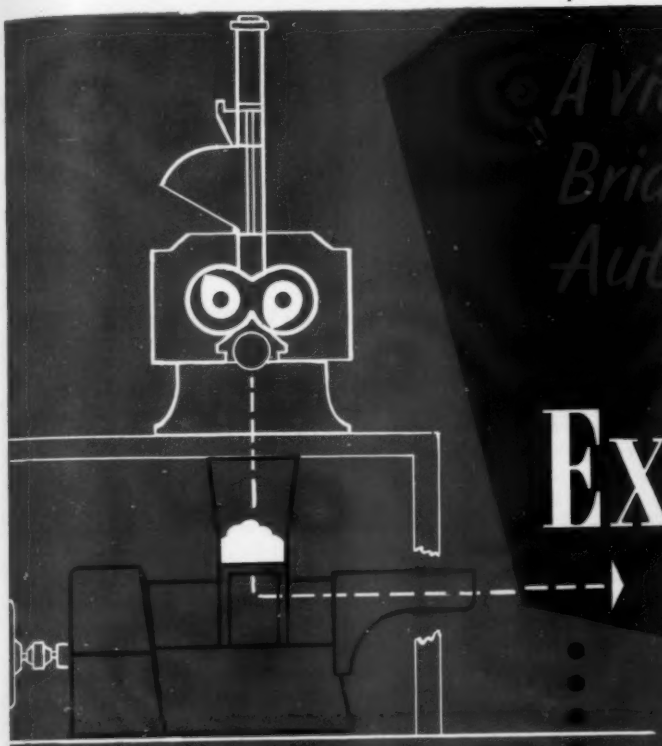

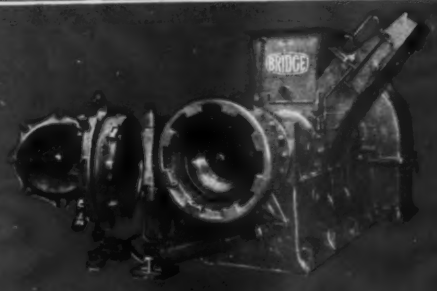

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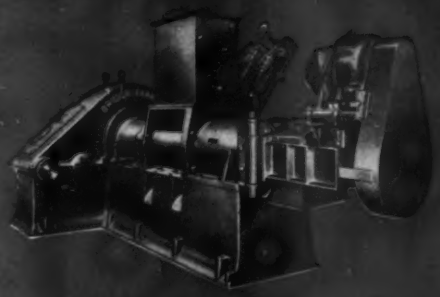

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VIEWS and REVIEWS

Non-Destructive Thickness Measurements

AMONGST the technical papers in the April 1959 issue of the *ASTM Bulletin* (No. 237) is a paper by E. P. Brightwell (Du Pont, Research) having the title 'High Precision Non-Destructive Thickness Measurements of Organic Coatings' (*loc. cit.*, 67), which is a 'Rapid non-destructive method (*which*) can be carried out with any infra-red spectrometer equipped for reflectance measurements.'

General

The author points out that fundamental research on properties and behaviour of organic coatings frequently involves thickness, or changes in thickness, as one of the important parameters. Such research also frequently requires that sequential thickness measurements be made on a given spot in course of an experiment, and in this case a non-destructive test method is desirable. In this connexion non-destructive methods based upon electromagnetic induction instruments 'have long been available, but these are limited to magnetic substrates and often lack the needed precision.'

An 'accurate but *semi*-destructive optical method is also available for measuring film thickness,' and non-destructive measurements of very thin clear films have been made by using interference phenomena which take place when a thin film is exposed to visible light, but the use of visible light restricts this method to very thin (<0.1 mil.) clear films.

Present Method

In the present paper a method based upon infra-red interferometry is described, which, according to its author, has an average standard deviation of 0.008 mils. for coatings 0.1 to 3 mils. thick. Moreover, this method is applicable to pigmented coatings attached to 'any reasonably smooth metal substrate, and to clear films over silicon or graphite. It is rapid, non-destructive and can be carried out with any infra-red spectrometer that is equipped for reflectance measurements.'

Theory and Practice

The author discusses the theory of his method at some length with the aid of several illustrations, and sample preparation is also described. Thus, it is mentioned that front surface mirrors prepared by evaporating either silver or aluminium on to ordinary plate glass are a very satisfactory substrate for pigmented materials, but this method is not (*for reasons explained*) applicable to clear films. In the latter case silicon mirrors or graphite applied to plate glass from an oil dispersion are satisfactory 'as they reflect only 25 to 50% of the infra-red radiation.'

Testing Procedure

In the elaborate 'Theory' section, sample preparation is included. Testing procedure is described quite briefly. It is stated that any infra-red spectrometer which can be equipped with a reflectance attachment is satisfactory for making these measurements. 'The specimen measured is placed on the reflectance attachment and the instrument operated in the usual fashion.'

Results

'Results—Absolute Accuracy' is the section description of results.

Comparing averages of replicate measurements using the infra-red technique with values obtained by direct measurement—using an optical slit microscope—the latter is less sensitive than the former, and the former (*i.e.*, the infra-red technique) is non-destructive. The accuracy of the infra-red technique is, however, greatly reduced by the use of a rough substrate such as bonderized steel.

Applications

The infra-red technique was used for studying the loss of thickness (degradation) of various polymeric materials both clear and pigmented. Materials exposed to the unfiltered radiation of a UA-11 lamp showed* 'this method to be very satisfactory for measuring loss of film thickness due to degradation. It detected large differences between different polymeric systems and also demonstrated the protection afforded by pigmentation of the same systems.'

(*Plotting loss in thickness against time exposed.)

Ageing of NR

A paper entitled 'Ageing of Natural Rubber Vulcanizates in the Presence of Dithiocarbamates' by J. R. Dunn and J. Scanlan, has been reprinted from *IRI Transactions*, Vol. 34, No. 5, 1958, p. 228, and constitutes Publication No. 300 of the British Rubber Producers' Research Association.

This is a paper the details of which should repay close study, but one point in the work which, in my view, is of special interest, is that the thermal and photochemical ageing of a number of rubbers was investigated by measurements of stress relaxation, carried out in apparatus as described in previous communications.

Cross-Links in TMT-Zinc Oxide-NR Vulcanizates

'The Nature of the Cross-links in Tetramethylthiuram Disulphide-Zinc Oxide-Natural Rubber Vulcanizates' by C. G. Moore, discussed in a letter published originally in the *Journal of Polymer Science* (1958, Vol. XXXII, No. 125, 503) forms (reprint) Publication No. 301 of the British Rubber Producers' Research Association.

History

Whilst the mechanism of curing of NR by TMT and zinc oxide has been the subject of much recent research

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

and speculation, and such studies have clarified the kinetics and stoichiometry of TMT decomposition and zinc dimethyldithiocarbamate formation, they have not, as the writer in his introductory remarks holds, directly aided our knowledge of the nature of the cross-links in the resultant vulcanizate. In addition, he points out that it was suggested earlier that the vulcanizate contained only C-C cross-links, comparable with those formed by means of di-*tert*-alkyl (and aralkyl) peroxides, while, more recently, disulphide cross-links have been proposed.

In relation to the foregoing, however, Moore states that neither of these views has been confirmed by direct chemical studies of the vulcanizate, and he has now presented evidence, in the said letter, which shows that there can be no appreciable amount of C-C cross-linking by the TMT-ZnO combination, and that this is consistent with the view that sulphur cross-links predominate.

Reason for Present View

The conclusion now expressed by the author is based on the respective swelling properties in *n*-decane of dicumyl peroxide vulcanizates (containing only C-C cross-links) and TMT-ZnO vulcanizates, which have been treated with methyl iodide *in vacuo* at 80°C. This latter reagent, it is explained, is known to cause the fission of C-S and S-S bonds in various organic mono- and polysulphides, and should, therefore, cause the fission of sulphur cross-links in a vulcanizate, with consequent degradation of the network, whereas there is no evidence that di-allylic C-C cross-links can be similarly degraded. *(Note: For documentation of the foregoing argument, cf. references in the original publication.)*

The 'Weightless Wonder'

In its *Staff-Industry Collaborative Report* section *Industrial and Engineering Chemistry* (March 1959, Part 1, 232) includes an article by Laurence J. White (Associate Editor) in collaboration with George J. Duffy (Godfrey L. Cabot) on a material which, on the cover, is referred to as 'Colloidal Silica-weightless wonder.' However, the title of the said article, specifically is 'Vapour-Phase-Production of Colloidal Silica,' with explanatory heading:

> 'Vapour-phase process is used to produce colloidal silica of high purity, low water content, and large external surface areas.'

This article, covers, with the inclusion of a Flowsheet and several other illustrations, some seven pages of our contemporary, but a bird's eye view in I/EC 'Briefs' section gives a very useful compressed historical account of this interesting matter.

The more immediate position is given briefly on page 231 ('The Editor *looks* at . . .') thus:

'*The Colloidal Silica market is growing.* And Godfrey L. Cabot's plant, described in this month's Staff-Industry report, will grow right along with it. Sales in 1958 were 1,000,000lb. 1959's estimates come close to 3,000,000lb.'

With regard to process, it is mentioned that Cabot's new plant at Tuscola operates by burning $SiCl_4$ with hydrogen and oxygen to make 'Cab-o-Sil.'

Whilst the price of the silicon tetrachloride is of prime importance in the economics of the process, another factor in this regard is to have a convenient outlet for the 7lb. of 35% hydrochloric acid formed for each lb. of the colloidal silica made by the Cabot continuous process.

The supply of hydrogen is also an important feature. At Tuscola, the account in I/EC mentions, a location was found which 'ideally met the two major needs of the Cab-O-Sil process. Two pipelines now link Cabot with US Industrial Chemicals Corp., the one carrying hydrogen from USI to Cabot, and another carrying HCl from Cabot to USI.'

Many interesting plant details, etc., are covered by the White-Duffy report, but I must content myself by giving a few particulars of the nature of the physical properties and of applications of 'Cab-O-Sil' mentioned.

Physical Properties

Silica %	99.0–99.7
Particle size, μ	0.015–0.020
Specific Gravity	2.1
Bulk density, lb./cu. ft.	2.5–7.0

Typical Applications

Reinforcing: 22 parts COS *per* 100 NR=TS of 4,000 psi.

Suspending: 0.2% COS retards settling of high density pigments in paints.

Thickening: 12% in water or 7% in benzene produces a soft gel.

Thixotropy: 1% in polyester resin increases viscosity from 410 to 8,000 centipoises.

(For further data cf. tables and letterpress.)

Chemicals from Oil

Amongst the many other interesting papers and articles in the issue of *I/EC* quoted above, there are two from *Esso* Research, namely (a) p. 247: 'From Oil to Chemicals' by C. E. Morrell, and (b) p. 248: 'Some Developments in Polymers in Petroleum,' by P. V. Smith, Jun.

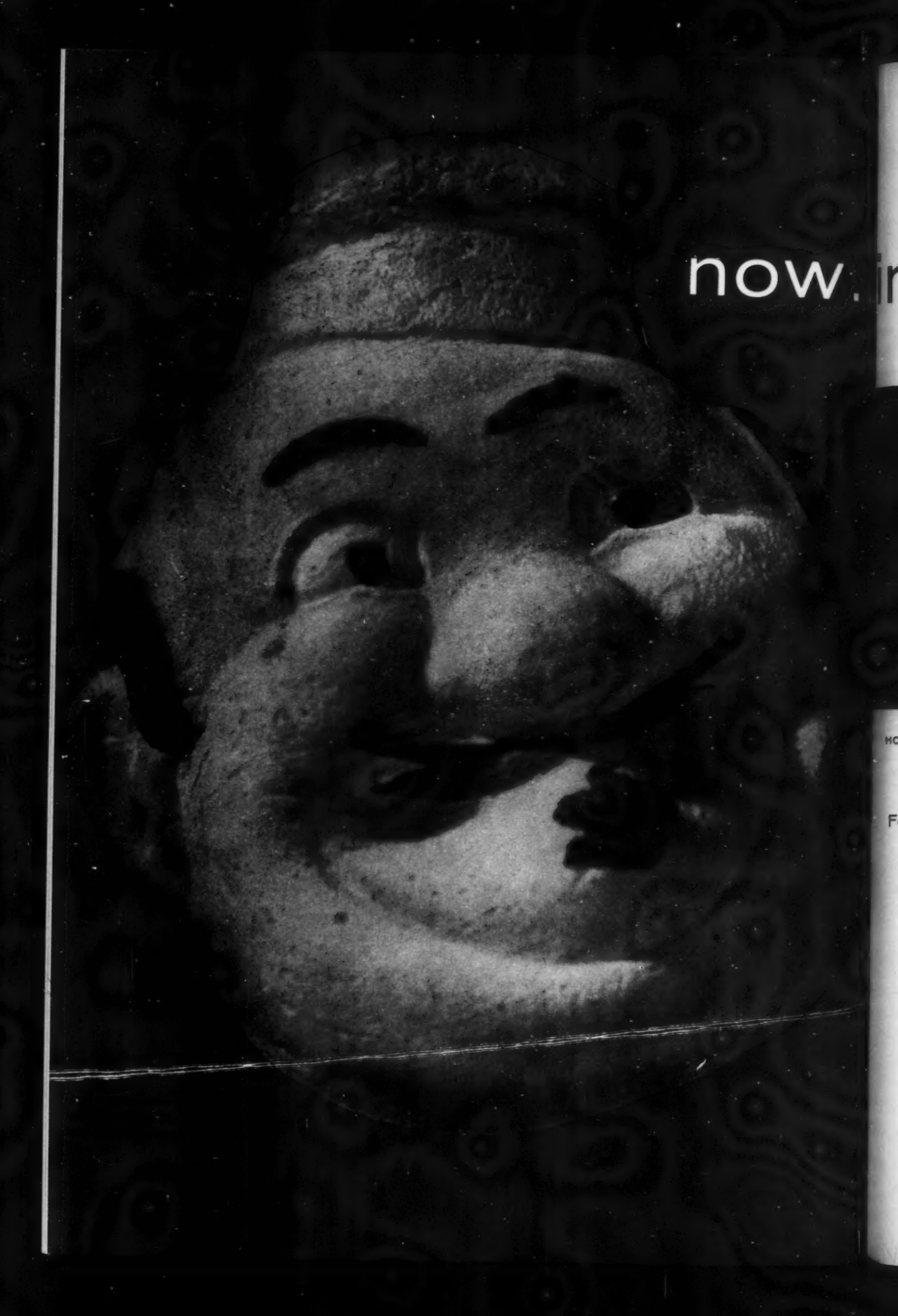
Propylene

In addition to the above, there is a 4-page paper on a comparatively new subject which should be of special interest (pp. 249-252) entitled 'High Purity Propylene—A New Problem,' by J. S. Sherred and J. R. Fair (both of Monsanto Chemical Co.).

The introductory summary of the Propylene paper says: 'Newer uses in the chemical industry require propylene of 99% purity, higher than usually available. Here is a discussion of propylene supply and demand, together with economics and technology for producing high-purity material.' At the present time Table II, showing the relative amounts of propylene used in chemicals for various purposes, seems particularly interesting.

[Note: The two last brief references (*Chemicals from Oil* and *Propylene*) relate to papers placed before Division of Petroleum Chemistry, Symposium on Recent Developments in Chemicals from Petroleum, 133rd Meeting, ACS, San Francisco, Calif., April 1958.]

PHILIP SCHIDROWITZ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Questions Corner—74

(Second Series)

315. For extruding various types of plastic materials it is recommended that screws of varying designs are used. Give brief details.

316. Polyvinyl carbazole has been recommended for electrical applications. What is this polymer?

317. Are there any standard tests suitable for polytetrafluoroethylene resin moulding and extrusion materials?

318. What are the important features of a screw type of extrusion machine?

(Answers next week)

Answers to Questions Corner—73

311. For solution copolymerization maleic anhydride with other monomers, such as styrene, vinyl ethers or vinyl acetate, acetone or benzene may be added to dissolve the anhydride. The product may be precipitated by adding petroleum ether (CIOS Rept. File 33-23). Partially cross-linked copolymers of styrene-maleic anhydride-divinyl benzene have been developed as water soluble thickening agents (USP 2,533,635; 2,621,169).

Maleic anhydride may be copolymerized with vinyl ethers, using peroxide catalysts, in acetone or benzene (Ind. Eng. Chem. 1949, *41*, 1509). Styrenation of epoxy resins, drying oils and alkyd resins may also be carried out in solution. One advantage of using solvents in such reactions is that it avoids the formation of incompatible styrene polymers of high molecular weight. Alkyd resins containing unsaturation may be styrenated in a solvent (BP 683,126).

In order to produce lubricant additions of comparatively low molecular weight a solvent is used which may be a hydrocarbon oil (BP 683,465; 686,381; 686,384).

Vinyl acetate has been polymerized in solution with ethyl acetate, using benzoyl peroxide as the catalyst (BIOS 744). The polymer solution was blended with methanol to adjust it to 60% solids.

* * *

312. One of the important extrusion processes is that of the production of layflat or tubular film. Essentially the method consists of extruding the material through the die and, as it emerges, it is inflated over a constant air mandrel which is introduced through a stopcock at the bottom of the die.

Some kind of cooling device is placed above the die through which the inflated tube passes. The tube is then passed through a pair of nip rolls set on a frame vertically above the die. The frame also supports a take-up reel on which the flattened tube is wound. One of the nip rolls is usually polished steel and the other a rubber covered roll. As the tube passes between the nip rolls it is pressed flat and this serves as a seal for the air bubble in the tube above the die.

The diameter of the blown film is usually between one and three times the diameter of the die orifice so that one die is adequate for producing a range of film widths. The rate of take-off by the nip rolls can be adjusted so as to give longitudinal draw down, and give some degree of orientation. Two wind-up reels are provided so that the process need not be interrupted to change the reels. Provision can also be made to trim the edges of the flattened tube and so produce two thicknesses of flat film simultaneously.

* * *

313. An American specification ASTM 1430D-58T covers the basic tests of polychlorotrifluoroethylene moulding and extrusion powders. Five grades are specified, each representative of a different range of apparent molecular weights.

1. Specific gravity is determined from a moulded sample.

2. Zero Strength Time (ZST) test in which a notched strip is used and a static weight (7.5g.) is clipped on to one end and the whole assembly inserted into a furnace maintained at 250°C. The time taken for the sample to break is recorded in seconds. ANST (no-strength-temperature) test is also used (Kel-F. Tech. Bull. Jan. 1949, 2).

3. Solution viscosity is determined with 2,5-dichlorobenzotrifluoride of a nominal boiling point of ca.175°C., as the reagent. A modified Ubbelohde Viscometer is used.

4. Flow Index is an extrusion discharge rate at a predetermined temperature, pressure and using a die of specified dimensions.

* * *

314. BS 476: Part 1: 1953 is a revision of the Standard first published in 1932. There is one important deletion of the non-flammability test which was considered to be more suitable for fabrics and similar decorative materials, in which case a similar test to that given in BS 1547 would be more satisfactory.

Section 1 is a combustibility test applied to materials used in the construction or finishing of a building or structure. Details are given as to what constitutes combustibility within the meaning of the term.

Section 2 is for a surface spread of flame test and is applied to materials used for walls and ceiling linings so that they may be classified according to the tendency for flame to spread over the surfaces. Four classes are given based on the speed of the effective spread of flame.

Section 3 is for fire-resistant tests designed to grade elements of building structure according to their ability to resist fire while fulfilling their normal design functions. Details are given of an apparatus for preliminary surface spread of flame tests.

(More questions next week)

FBRAM TRANSPORT COMMITTEE

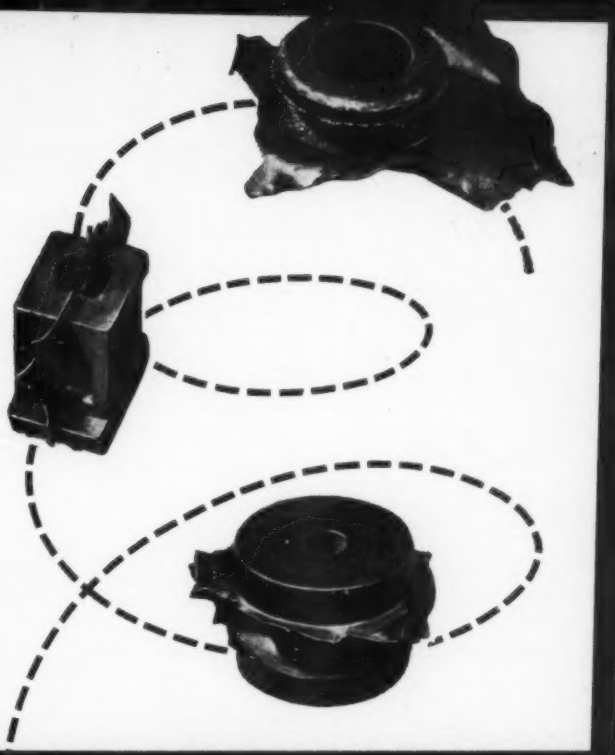
The Transport Committee of the Federation is meeting in Leicester on Thursday June 4 and companies within a reasonable distance of that city are being invited to send a representative from their transport or traffic departments to join in the proceedings of the meeting, which will take place at 10.45 a.m. at the Grand Hotel.

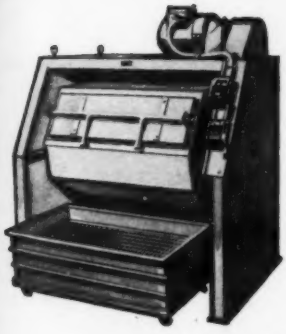
In the afternoon the Committee is seeing over the Motive Power Depot at London Road Station, Leicester, the Control Room at Nichol Street, and will visit the Freight Transport Exhibition at Belgrave Road Station. Representatives of companies are cordially invited to join the Committee in these visits.

Polly Ester Says . . .

'Dough moulding — what they do at The Mint'

De-flash small rubber parts with 'DRIKOLD' in the Columbian International Sub-zero Tumbler

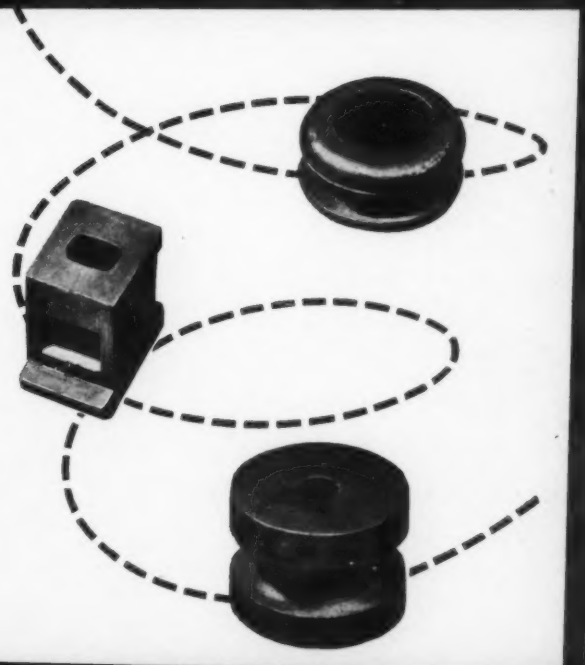




Sub-zero tumblers are obtainable from Columbian International (Great Britain) Ltd., 116 Cannon Street, London, E.C.4.

De-flash by freezing

When small rubber components are frozen in a rotating drum with 'Drikold'—I.C.I. solid carbon dioxide—flashes become brittle and the tumbling action breaks them off. Sub-zero de-flashing with 'Drikold' can cut costs, speed processes, increase production. I.C.I. Technical Service staff will advise on problems and will de-flash sample batches of components on request.



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DR. 307

MEN and MATTERS

A Review of People and Events

by George A. Greenwood

MOST business people just now, both at home and abroad, are getting up in the morning and going to bed at night with a song in their hearts. It is certainly a long time since the general situation seemed to be so set fair for a progressive expansion of industry, trade and commerce, and the news that the Anglo-Russian trade talks in Moscow have achieved at least some measure of success is one of the invigorating signs of the times.

In the circumstances, I have taken the trouble to read a little more carefully than usual the many references which I come across to rubber and plastics but what is perhaps more important, to sound personally men whom I meet in the trade, and I can tell you that in general they supply ample confirmation of what my colleagues in the financial and the daily Press are telling us. In this connexion I would draw your attention to what an old colleague, Mr. Edward Westropp, now City Editor of *The Sunday Express*, has to say. 'In my eight years as City editor,' he declares, 'I have never felt happier, more optimistic...The world is heading for a boom which could be the biggest in history.'

Well, about that we shall have to wait and see, but the really interesting thing so far as we are concerned is that in his survey of existing conditions and immediate prospects, and after talking about the astonishing progress and prosperity of the motor car industry, he goes on:

'The Humid Heat of Malaya'

'Let's get right away from Coventry—away from the smoke and the clang of the presses to the humid heat of Malaya, where a great boom in rubber is in process.

'Everybody said at the end of the last war that natural rubber was doomed because of the development of the synthetic product. Doomed my foot! The requirements of Russia and the Western world have pushed the price up to a highly profitable 2s. 5d. a lb. and experts reckon that consumption in 1959 will touch 2,000,000 tons.

'When they get back to their bungalows for the evening stingah, the estate managers find urgent cables waiting for them. These messages always have the same purport: "Woodman, tap those trees."'

He proceeds to remind us that one can still get 'the most exciting yields,' as he describes them, on rubber shares, including 11% on United Sua Betong, 12% from United Temiang, and 13% from Port Dickson, and he has nice things to say about the leadership of Sir John Hay.

One interesting thing about rubber consumption is that it goes on advancing in directions which we are not prone to expect. An example is provided by British Ropes, which I can well remember when it was a small organisation of comparatively little account in the West Riding. It has just greatly increased its capital by the issue of shares on a one-for-four basis, and an issue of 6,682,777 ordinary shares at 7s. 6d., which has raised nearly £2,500,000. On a capital now of approximately £7,000,000, it is apparently still able to pay a dividend of 18%.

Plastics

A Board of Trade announcement tells us that nett sales of plastic materials during 1958 at 416,000 tons were more than 22,000 tons—or 6%—higher than in 1957 so that I don't understand the financial paper which said last week that because it has had to contend with a growing volume of imports from foreign manufacturers, the fast growing plastics industry received quite a check last year. I wonder how they make that out?

It is confirmed neither by the Government figures, nor by those of individual companies. For example, British Xylonite last year had a turnover nearly 9% above that of 1957, and it totalled over £12,000,000. Mr Denzil H. Carlisle, as chairman of the P. B. Cow Co., told the annual meeting in London that turnover in the parent company was some 3% up in total, the increase on industrial sales being 9% up. As a matter of fact, in plastics just as in other industries, but really it seems a little more so in plastics, the industry is to some extent bedevilled by rising costs—wages perhaps being to a considerable extent responsible—and thus inevitably closer margins of profit, but even so, P. B. Cow and Co. can still pay a total of 12½% less tax on the ordinary stock, which is certainly not to be sneezed at.

Speed the Keynote

It is always pleasant to be able to report enterprise, and here surely is an excellent case in point.

An urgent telephone call from the Belgian Congo, some 4,000 miles away, to the Wolverhampton factory of the Goodyear Tyre and Rubber Co. (Great Britain) Ltd., requesting 20 Goodyear 18.00 x 25 Hard Rock Lug earthmover tyres, set into action a high speed air and water lift.

Within a few hours of Goodyear receiving the order from their offices at Leopoldville the tyres — wanted urgently for a civil engineering project operating on land development at Elizabethville—were on the first leg of their journey to the Belgian Congo.

A charter aircraft made two trips from Elmdon airport, Birmingham, to Antwerp, and at Antwerp the tyres — their total weight some six tons—were transferred to a waiting ship bound for the Belgian Congo port of Matadi. On arrival there they were immediately transferred to a waiting plane for the final stage of their journey to Elizabethville.

By normal methods, the trip would have taken five weeks, but the combined air and water lift ensured the tyres arrived on time, in just under 20 days.

An 'Angus' Development

From our mutual friends of the Angus organization — George Angus and Co. Ltd., the Newcastle upon Tyne—comes the news that, following the re-establishment of their rubber factory at Walker, it has been possible to release Angus Oil Suction and Discharge Hose to the home market. This has, of course, been available in the export field for some time, and has been well proven under varying operating and climatic conditions in a number of countries. Accordingly, they have produced a new catalogue, and have sent me a copy. I find it

under Olympian patronage...

MERCURY, the winged messenger, had self-propelled sandals which carried him across land and sea with the rapidity of the wind. As if being Postmaster-General to the gods was not enough he also became patron of all the games. That this patronage extends to Dunlop there can be no doubt. For Dunlop sports equipment is blessed with all that is needed for success. Champions at tennis, golf, squash and badminton have used it for many years past, including clubs, bats, balls, footwear, clothing. And millions enjoy the use of these and other kinds of sports equipment in the Dunlop range during their leisure hours. Thus Dunlop, pioneer in rubber, leader in plastics and many associated products, has enlarged its already extensive services to the community.

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CPH/PRESS/10

very interesting especially because it gives quite new information about the many and varied uses to which the hose can be, and in fact is put. It contains also some valuable guidance for the care of hose during use.

The Blind Use Plastics

For some time I have been interested in the work of the organization which trains guide dogs for the blind, but I did not know until the other day that the use of plastics materials and machinery has made it possible for the blind to mass-produce top quality articles at commercial and competitive prices.

This is a step forward, and the way it has become valuable in the gainful employment of large numbers of sightless men and women will be demonstrated at the International Plastics Exhibition in June. Then, at Stand 400, the London Association for the Blind is making its first appearance at an industrial show of this nature. Let me quote from some official information which has been sent to me. It says:

'A blind operator will be seen working a modern automatic injection moulding machine. Around him, a display of products will signify the commercial success of the Association's moulding shop at Peckham. The display will contain a wide range of plastics articles, including table mats, combs, lighting reflectors and reflector housings, translucent letters for illuminated signs, spools, 3-D viewers, bicycle fittings, mudguards, etc.'

The man behind this most interesting scheme, ambitious yet practical, is the moulding shop's manager Mr G. T. Pain, who took over what apparently is to him a pleasant task about 11 years ago. The exhibition at Olympia should provide ample proof for his theory that blind workers can be trained to operate modern injection moulding machinery and turn out competitively priced, top quality products working the same hours and earning the same wages as those of us gifted with sight.

Goodyear Changes

Two important appointments within the framework of their sales organization have just been announced by the Goodyear Tyre and Rubber Co. (Gt. Britain) Ltd., Wolverhampton.

Mr F. J. Battersby (previously manager of the firm's North Western Division at Salford, Lancs.) has been appointed manager, Sales Personnel and Sales Development Division at the Goodyear headquarters at Wolverhampton. Mr Battersby has been associated with the firm since November 1934, when he joined Goodyear as a salesman in the Western Division. In 1937, he was transferred to Northern Ireland as District Manager and, as a Territorial officer, served with the Army throughout the wartime period. He rejoined the firm in 1947 in the old Northern Division, to which he was appointed district manager in 1948. He took up the appointment of manager, North Western Division, in April 1949, which he now leaves for his new position at Wolverhampton.

Succeeding Mr Battersby as manager of the Goodyear North Western Division, is Mr E. D. Mackintosh, who joined the firm in July 1947. Mr Mackintosh served Goodyear firstly as a salesman in the North Eastern Division and, in December 1956 was transferred to Northern Ireland as district manager (North Western Division), the position he has now left to take up his new appointment in Salford.

The Sultan

We were saying farewell recently to His Highness the Sultan of Johore, who died at the veteran age of 85 at Grosvenor House, Park Lane, which for some years was his British home. The interest of all of us who have anything to do with rubber in his passing is something more than purely academic, for Sir Ibrahim, as he was generally known among his intimates in the old days, was something more than an Oriental potentate. I met him only once or twice, the first time about 20 years ago, just before or just after the beginning of the Second World War, and I recall how strong an impression he made upon me because of his knowledge of the rubber trade to which the remarkable developments in Johore over the preceding years had made such a big contribution.

In recent years I suppose we have tended to forget that in the old days he was the personal owner of a great many thousands of acres of plantations and of course he remained to the end deeply involved in the industry. These interests must have accounted during the past 50 or 60 years for a good deal of the vast accumulation of wealth which still stands in his name, and it is certainly a fact that when I talked with him he made no bones about his acknowledgment that rubber and tin were really at the base of these riches. What is more he was very free in his acknowledgment of the part that British interests had played in the development of the industry. That perhaps is why, during the years when his vast wealth was developing, he was so lavish in his generosity to this country which he loved. One of his greatest gifts was made in 1935 to mark the Silver Jubilee of King George V. It was £500,000 sterling to the British Government for the purpose of accelerating the completion of Singapore's defences.

One thing we forget sometimes, and that is that he had a few years ago celebrated his diamond jubilee as Sultan. What I recall is his command of colloquial English.

67 Years with Same Firm

Eighty-four-year-old Mr J. H. Watts has received an award to mark his completion of 67 years' service with Capon Heaton and Co. Ltd., Stirchley. Mr Watts says that the reason he still feels so well is that he does not worry unduly about his job. 'At one time,' he says, 'I used to stay late at night to do extra work—and worry. I lost weight.' His record with the company is a distinguished one—he was one of the firm's first first-aid men, and a machine which he invented in the 1930's is still in regular use in the factory. The crowning point of Mr Watts' achievement, to my mind, is that he still rises at 6.30 every day.

Sir Thomas A. Wedderspoon has been appointed a director of the Highlands and Lowlands Para Rubber Company.

An extensive range of Ekco industrial mouldings will be displayed on the stand of Ekco Plastics Ltd., at the forthcoming International Plastics Exhibition, Olympia. Also on show will be a wide selection of Ekco 'Gold Seal' domestic ware as shown in this rough impression of the stand, sidegned by Robin Day

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International Plastics Exhibition

EXTRUSION

A PAPER, 'Studies in the Extrusion of Thermoplastics' will be given at the International Plastics Exhibition Convention by D. A. Lannon and G. C. Karas. A single-screw extruder with extensive instrumentation has been used to study the relations between factors affecting quantity and quality of extrudate for several thermoplastic polymers.

Barrel temperature has been controlled and measured in a number of zones and the pressure in the polymer melt determined at points near the die end of the barrel. The temperature inside the die has been used as an indication of melt temperature and from the indications of a thermocouple which could be moved along an axial hole in the screw an assessment made of polymer temperature as it varies along the screw. The mechanical properties of the extrudate have been used as a measure of quality.

Previous theoretical work has been used to examine the behaviour of polymer viscosity as the temperature and rate of shear vary. An attempt has been made to assess the power requirements for extrusion under varying conditions to seek information which will help in the prediction of efficient working conditions for the different polymers.

The 'Extrusion of Acrylics' will be discussed at the Convention by L. Griffiths, Plastics Division, Imperial Chemical Industries Ltd., Welwyn Garden City. There has been in recent years a steady growth in the usage of polymethyl methacrylate materials for injection moulding and extrusion. The expansion has been made possible by significant improvements in the materials themselves together with an increasing degree of engineering perfection in the design and construction of modern conversion machinery. In the United Kingdom, extrusion of acrylics has tended to lag behind injection moulding but the situation is changing rapidly and the object of the paper is to review recent developments in acrylic extrusion with particular reference to some novel techniques devised in the laboratories of the Plastics Division of I.C.I.

Starting with a discussion of acrylic polymers available for extrusion, the paper goes on to review their extrusion behaviour and suggests basic design features of extrusion equipment necessary to obtain quality extrudates at economically attractive output rates. Extrusion of rods, tubes, profiles and sheets from rigid materials like acrylics can be regarded as a continuous moulding process. To obtain good quality extrudates of consistent dimensions and with minimum strain, particular care is required in the provision of dies and finishing gear. The underlying principles are outlined and fully illustrated with examples of dies and finishing gear for each category of end product.

Particular attention is drawn to a process for post forming sections from tube dies. In this, a tube is slit as it leaves the die face and the 'rubbery' nature of acrylics at elevated temperatures is exploited to obtain the desired shape by use of formers or rollers or combinations thereof. Diffusing troughs for fluorescent lighting fittings provide the outstanding application for extruded acrylics in Great Britain at the present time, and this post forming technique is making a substantial contribution to its success.

Hot-Water Bottle Action

INJUNCTION OBTAINED

IN the Chancery Division on May 15 P. B. Cow and Co. Ltd., of Streatham High Road, S.W., were granted an injunction restraining Cannon Rubber Manufacturers Ltd., of Ashley Road, Tottenham, from infringing plaintiffs' registered design in respect of a type of rubber hot-water bottle.

Defendants denied infringement of the design and its validity.

Mr Justice Lloyd-Jacob said defendants admitted plaintiffs' title to the design, and that they had manufactured hot-water bottles under the brand name 'Cosy,' which were alleged to constitute the infringement, but they attacked the validity of plaintiffs' design.

The unusual feature of the design which immediately struck the eye was the presence on the front and back of diagonal ribs projecting from the surfaces.

Under Rule 14 (2) of the Designs Rules 1949, the application for registration had stated that the novelty of the plaintiffs' hot-water bottle was claimed to reside in its configuration. Defendants said that the absence of a reference to decoration meant that the ribbing must be disregarded.

In his lordship's judgment the validity of the registered design had to be considered on the footing that the ribbed appearance was a characteristic feature of it.

The hot-water bottles were moulded in two halves, the back and the front, and the ribbing machined on. The use of a moulding operation in the construction of hot-water bottles was clearly not affected by the registration of this design.

Defendants' alleged infringing product, on close comparison, was in some respects different from plaintiffs' design. The ribbing was on the opposite band and on the front face was interrupted by a medallion bearing the name 'Cosy.'

The provision on the plaintiffs' design of the ribbing properly constituted a design feature, and the design was valid. If comparison were limited to the front view substantial identity between the designs of the plaintiffs and defendants was in his lordship's judgment clearly apparent, and the rear view fortified this conclusion. Plaintiffs' registered design was therefore both valid and infringed.

His lordship made an order for delivery up of offending articles, an inquiry as to damages and a certificate of validity for the registered design. He granted a 28 days' stay of execution of all but the certificate of validity pending consideration of an appeal, remarking that the case had raised questions of considerable importance.

Defendants were ordered to pay the costs of the action and their counterclaim for revocation of the registered design was dismissed, with costs.

Phillips Petroleum Company and Industrial Development Corporation of South Africa Ltd. are forming Phillips Carbon Black Co. 'Proprietary' Ltd., to build and operate a plant to manufacture oil carbon black in South Africa. The plant is scheduled to be in operation within two years and have an initial design capacity of 22m. lb. annually of oil blacks now used generally by the rubber industry. The plant's site has not yet been selected.

Companies in the News

Columbian Carbon

At the annual meeting of the Columbian Carbon Company held on April 28, Mr L. L. Shepard, president, said that earnings for the first three months of 1959 were the highest ever attained in any quarter, exclusive of non-recurring items, during the company's existence. Sales amounted to $18,642,000 compared with $16,256,000 in the same period last year. This represents an increase of $2,386,000, or 14.7%. Net earnings amounted to $1,955,000, equal to $1.21 per share, an increase of 72.7%, compared to $1,132,000, equal to $.70 per share, for the 1958 period.

Mr Edwin L. Kennedy, a partner in the investment banking firm of Lehman Brothers, and Mr Edwin B. Brooks, vice-president in charge of the Carbon Black and Pigment Division of the Columbian Carbon Company, were elected to the board of directors, it was announced.

The British Xylonite Company

The statement by the Chairman, Sir Laurence Merriam, circulated with the report and accounts, includes the following:

Group sales to external customers again increased, and amounted to nearly £12 million against £11 million last year. The consolidated group profit before tax at £1,023,877 was 6% less than the record figure of £1,090,557 last year. Taxation was lower, consequently the consolidated net profit of the Group at £480,877 was slightly better than last year.

A somewhat larger proportion of this profit was attributable to the Xylonite Company and a little less to outside shareholders with the result that the Xylonite Company's share of the net profit amounted to £307,520 against £277,408. This is a record for the company and has enabled the directors to increase the dividend from 13% to 15% and yet plough back £161,817 which is more than last year.

Capital expenditure, which for the last seven years, with one exception, has been running at just over the half million mark, increased substantially in 1958 and amounted to £860,000. Trade investments remain at £3,354,024.

Halex Division—1958 was a much better year than 1957. There was a substantial increase in both sales and profits, despite continued severe competition, and the outlook for 1959 is encouraging.

Cascelloid Division—1958 was a year of continued development. The exploitation of know-how and patents overseas, both in toys and industrial products, is now yielding additional income.

On subsidiary and associated companies, Sir Laurence says that for B.X. Plastics there was a reasonable increase in sales during the year, but conditions became very competitive. There is a substantial programme of capital expenditure for the next three-four years.

Expanded Rubber Company—Sales increased during the year, but profits declined slightly. This was due to intense competition, although Onazote—our insulation material—maintained its place.

In spite of foreign competition we are making good progress in our micro-cellular shoe soling material.

We are continuing to spend large sums in the group on research and development, especially in B.X. Plastics where the expenditure is about 2½% of the sales.

Reviews

THE SEQUESTRATION OF METALS—THEORETICAL CONSIDERATIONS AND PRACTICAL APPLICATIONS.—By Robert L. Smith, B.Sc., Ph.D., F.R.I.C. (London: Chapman and Hall. Price 42s.)

Although sequestering agents have come into use only within the last few years, a great deal of concentrated work has been carried out on their applications both in the academic field in the field of chemical analysis, and in industrial applications. Dr Smith has himself found the need for a textbook on the subject which he covers in a most satisfactory manner. He has gathered together information from a wide variety of sources and his book will be of great value to those interested in any aspect of the matter.

The chapter on applications contains five or six pages relating to rubber and plastics. It describes the effect of EDTA in polymerization techniques and for preventing the deterioration of hot-water bottles from water which contains copper. Other industrial applications are also well covered.

The diagrams and formulae are clear. So, too, is the language of the author who, together with the publishers, are to be congratulated on an excellent publication for which the price is reasonable.

MALADIES OF HEVEA IN MALAYA.—By Roger N. Hilton, with 41 water colours by Hoh Choo Chuan. (Rubber research Institute of Malaya.)

The health of the plant is of first importance in the economy of rubber plantations: its protection demands from the cultivator constant vigilance and an up-to-date knowledge of relevant research. 'Maladies of Hevea' puts at his disposal, in concise and lucid form, a guide to the diseases and disorders of hevea, embodying the results of investigations at the Rubber Research Institute of Malaya. Prepared primarily as a recognition manual for the planter in Malaya, this book will be of value to cultivators of rubber everywhere and to all advisory officers and research workers interested in the pathology of *Hevea brasiliensis*.

The introduction contains a concise statement on the characteristics of diseases in general and an exposition of the approach adopted to the classification, diagnosis and control of hevea diseases. There are descriptions of individual maladies, arranged according to the part of the plant affected. A pair of pages is devoted to each disease or disorder, each account being accompanied by a page of illustrations in natural colour. 'Maladies of Hevea' covers diseases, injuries and disorders of the rubber plant but excludes pests which will be the subject of a later publication. Nutritional disorders are not given detailed treatment: they have already been described in Communication 300 of the *Journal of the Rubber Research Institute of Malaya*, Volume 14, 1956.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Jury Holloware Ltd., Brierley Hill, Staffs., are now manufacturing a household bath in Rigidex high density polythene supplied by British Resin Products Ltd. The bath is suitable for many jobs. On its own it can be used for washing, soaking or dyeing clothes, as a foot-bath, or as a laundry 'basket,' while it is also valuable as a baby bath, for which purpose a folding wooden stand is supplied as an optional extra. The bath retails at 29s. 5d., the wooden stand costs 25s. 8d.

Plantation Commentary

ELECTION FEVER

by our Malayan Correspondent

SINGAPORE politics will be worth watching by those in the rubber industry this month with the elections for a fully-elected Legislative Assembly due on May 30. The coming event has already cast a shadow on certain sections of the share market, and other markets are likely to react in due course.

A very strong bid for power is being made by the left-wing People's Action Party, of whom Mr Lee Kuan Yew, the Secretary-General, is best known in the English-speaking world. Although the party has stated that it wants investment and intends to expand industry, its policy has lacked consistency on occasions, and some of its actions in the past (and undoubtedly a few yet to come) have given plenty of cause for apprehension to the business community.

The PAP has had a majority in the City Council, and the meetings of the council have been, to put it mildly, somewhat unusual. They have been punctuated by walk-outs, abusive expressions between the PAP and the opposition, and silly acts such as removing the Union Jack from the council and pictures of past presidents, and suggestions that the former council ran things badly and allowed corruption.

Now the PAP is to dissolve the City Council and the PAP mayor and the PAP councillors have resigned. At a recent rally the PAP accused the English language papers, the *Straits Times* and the *Singapore Standard* particularly, of distorting news and of being misleading and untrue, allegations for which it is difficult to find any foundation. One of the main speakers told the Press to come to their senses or be 'prepared to take the consequences.' There were also demands that the English Press should print PAP statements 'in full,' a difficult thing to do because they are very long.

Commenting on the PAP attitude to the Press, the *Straits Times*, in a strongly-worded editorial, declared: 'Not for one hundred years has the freedom of the Press in Singapore been in such danger as it is today. If the People's Action Party is in a position to form a government, one of its first concerns will be to bring the newspapers to heel.' The paper said that this was the only construction that could be put on recent PAP statements, and if this was not so it invited the party to say clearly, with no 'ifs' and 'buts.' It added, 'Like the individual, the Press is either free or not free.'

Equally gloomy on the future has been the authoritative *Foreign Commerce Weekly*, published in Washington by the US Commerce Department, which sums up considered opinion, obviously on the basis of consulate reports, very well. The weekly said: 'The general outlook for trade with Singapore is beclouded. . . . Both Malaya and Singapore seek foreign participation in development activities, but while free enterprise concepts appear to be prevailing in Malaya the policy direction in Singapore remains to be determined.

'In contrast to the Federation, the investment climate in Singapore continues to deteriorate. The Government is now considering energetic measures which go almost as far as the abandonment of the traditional free port policy providing for import duties on manufactured goods and the protection of domestic industries.'

The PAP has done nothing to dispel the fears of the business community, and Mr Lee Kuan Yew recently warned the cinemas here to watch their step after they had shut off their air-conditioning plants because the PAP-dominated City Council had increased the power rates to cinemas by a large margin. Mr Lee said a PAP government would hold an inquiry into the cinema industry. 'It may be necessary for a PAP government to intervene and free the cinemas from all monopolistic strangleholds and restrictive practices of film producers, distributors, exhibitors and cinema owners,' he said.

With these statements in the air businessmen are watching the events leading to the coming elections with the keenest interest. A few firms have taken what seem to be precautionary measures by making their branches in the Federation of Malaya into separate companies, and there is no doubt that recent PAP policies have inhibited investment.

One of the difficulties is that there is no sign yet of a strong opposition to the PAP. The party, supported by the present Chief Minister, Mr Lim Yew Hock, has been placed in difficulties by allegations that a Minister accepted $500,000 for party purposes from outside sources. The Commissioner investigating the allegations, a High Court judge, has stated that the fact that the Minister received the money has been 'proved up to the hilt,' and that he now wanted to pursue his second term of reference concerning the Income Tax Department.

It must be added that though there will be a fully-elected assembly after the elections, Britain still reserves certain powers, and internal security will be in the hands of a council with wide powers, on which there will be representatives of the elected government, of Britain and one representative from the Federation of Malaya who, in the event of even voting, will have the deciding vote.

Friendship with Indonesia

Although rubber is not specifically mentioned, the Treaty of Friendship which Malaya has concluded with Indonesia is likely to have some bearing on rubber developments in the two countries in the near future. The rubber industry, which is, of course, a major feature in the economies of both countries, was certainly frequently mentioned in the preliminary talks between Dr Djuanda, the Indonesian Prime Minister, the Malayan Prime Minister, Dato Abdul Razak, and the former Prime Minister, Tengku Abdul Rahman. (Tengku Abdul Rahman's resignation from the Premiership in order to organize his party for the general elections in August became official during the Indonesian visit.)

A clause in the treaty suggests that the two countries should promote the exchange of the findings and results of scientific and general research, a clear reference to rubber in particular. Malaya has much to offer in this way from its Rubber Research Institute, especially with smallholdings, but it is not at all certain here what Indonesia has to offer in this way. Research in Indonesia was, of course, of a high order during the Dutch time, but very little has been heard about it since in this country.

The rest of the treaty follows much the same lines as others in many other countries, and includes clauses aimed at making travel easier for the nationals of the respective countries, for exchanging a variety of items from paintings to pamphlets, and provisions for further discussions about an extradition treaty. Although Dr Djuanda said he was satisfied with what he had heard in Malaya, Indonesia is reported to have been annoyed about this country's attitude on Sumatran rebels who, provided their papers were in order, have come and gone fairly freely.

In private there has been some speculation and in diplomatic circles a good deal of brain-storming over whether Malaya will go more Indonesian because of the treaty, or Indonesia more Malayan. The fact is that no one knows.

No Foreign Missions

There has been a sharp exchange of words between the Minister for Commerce and Industry, Mr Tan Siew Sin, and Dato Sir Clough Thuraisingham, a Ceylonese leader who is president of the Malayan Estate Owners' Association. The result is that no Malayan mission will be going to Britain or any

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other rubber-consuming country to extol the virtues of Malayan rubber.

In a presidential address to the association, Dato Thuraisingham said that a mission would be useful to stimulate the sales of rubber from Malaya and, if necessary, to conclude a long-term agreement for the sale of rubber. He suggested that the mission should be sponsored by the Government and the Rubber Producers' Council.

'Unless this is done we cannot determine the extent to which synthetic production would be expanded in other parts of the world and the way in which natural rubber may be menaced in the coming years,' he said.

He referred particularly to China and Russia, and warned that Malaya would not be able to disregard such substantial purchasers of Malayan rubber on the grounds of political considerations and political ideologies.

'We want to sell our rubber,' he said. 'We want to sell it extensively to everybody who wished to buy it, particularly as we find that the Western buyers have launched programmes of synthetic expansion without any regard for the many millions of Asians who are solely dependent on the prosperity of the rubber industry.' He added that in 1957 China had bought 46.000 tons of rubber and last year 123,000 tons.

Mr Tan replied at a Press conference that he saw no reason to send a mission to sell rubber. 'Our rubber sells itself, and I see no point in sending a mission abroad to expand a market which is already larger than we are able on our present production to satisfy,' he said. He thought that one of the reasons for the proposal was to create an opportunity for world tours, including Russia and China. 'We are selling every pound of rubber we can produce without difficulty, and there is no reason to think that we shall not continue to do so,' he added. 'China's purchases are characteristically erratic.'

In a reply to this statement, Dato Thuraisingham said that Mr Tan seemed to have forgotten the slumps that had overtaken the rubber industry in the past. Terming the Minister's statement 'ill-mannered and evasive,' Dato Thuraisingham said, 'On the one hand to preach extensive cultivation and production of more rubber, and on the other hand to minimize the danger of a total collapse of the natural rubber market in the future cannot fail to call for quick censure of this Minister's attitude.'

There the matter rests, but it seems most unlikely that Mr Tan will change his mind.

Trade with India

If a large mission cannot go overseas, at least a one-man mission in the form of Mr J. E. Bush, manager of the Natural Rubber Development Board, has gone to India to interest that country in purchasing more Malayan rubber to meet her expanding demands.

Mr Bush said before leaving that India since the war had become more a consumer than a producer of rubber and was now importing about a third of her needs.

'This means we can expect the Indian demand for rubber to increase as its industrial plan progresses,' he said. 'We hope that in buying more overseas rubber India will take more Malayan rubber in the future.'

He felt it was possible that the Indian producers were not so enthusiastic about replanting because the Government-controlled fixed price for rubber there was often below the world market price. It was therefore not likely that under present conditions the Indian producers would be willing to spend money on expansion projects.

It was also unlikely that in a country that was food-hungry more land would be planted with rubber.

UPAM Annual Report

A demand that the Government should reduce the export duty on rubber to offset the recent increase in company tax from 30% to 40% has been made by the United Planting Association of Malaya. The increase in the company tax was imposed at the last Budget meeting of the Federal Legislative Council in December, and was most strongly opposed at the time by rubber industry representatives in the council.

The annual report of the association praises the Government for its efforts to attract local and foreign capital for development, but says these efforts have now become void as a result of the increase in the rate of company tax.

'It would appear to the association that this move could be classified as an error of judgment on the part of the Government as the plantation companies were already carrying a heavy burden of taxation prior to the increase, the incidence of export duties (payable whether or not profit is made) being especially onerous for rubber companies.

'In all equity a reduction of the export duty scales should now be made at least offsetting the increased amount payable by plantation companies in income tax.'

The association also commented on two matters of considerable concern to planters, elephants and sodium arsenite.

In Johore, the elephants have been creating havoc ever since they were disturbed in their jungle hunting grounds and moved closer to civilization, where they developed a liking for oil palm nuts and young rubber. An elephant's appetite is prodigious and they are decimating their favourite estates when they dine out.

Oil palm estates have been particularly badly hit, and one lost 46,000 young palm trees. Shooting, except in special circumstances, is prohibited in Johore at the moment, and various devices, including aluminium strips and an electric fence, which proved 100% successful in Africa, have failed.

Attempts are still being made to get the Government to take firmer action, but the loss to the companies must now total many thousands of pounds.

Sodium arsenite is extensively used on estates here as a herbicide, but the Minister of Agriculture has now recommended a total ban due to the casualties it causes to wild game that leave the jungle to feed on estates, and cattle which legally or illegally are allowed to enter. The association hoped that a marketable herbicide as cheap and effective as sodium arsenite would be found.

At present the alternatives are considered more expensive and there is some fear that they will put up production costs.

US Complaint

Rubber industry leaders here have paid little attention to a complaint from the US Rubber Manufacturers' Association that one-third of Malayan rubber bought by the US industry did not conform to contract specifications. The association said that American manufacturers had found it impractical and frustrating to complain to the Malayan Rubber Export Registration Board and had generally not bothered to do so.

General comment here was that it was a 'storm in a teacup.' It was pointed out that rubber could drop a grade during shipment and storage, and the question of rubber imported into Malaya from neighbouring countries and then re-exported would have to be taken into consideration.

There was little inclination here to take any action until the United States' manufacturers make an official complaint.

Retired to New Zealand

Mr A. T. Edgar, the proprietor of a firm of visiting estate agents in Kuala Lumpur, has left Malaya on retirement for New Zealand. He was a planter until 1940, when he took a staff job with the Kedah Volunteer Force, and was later transferred to the Indian Army when war broke out.

He was a prisoner-of-war on the 'Death Railway' in Siam and returned here in 1947 to become a visiting agent. He raised and commanded the Federation of Malaya Volunteer Reconnaissance Corps from 1952 to 1955.

Before he left he said that he felt that the prospects for the natural rubber industry were better than they had been for years.

'In my opinion it is a most exciting time for the industry here,' he said. 'The industry has to compete against synthetic, and it is only by attempting all the new ideas that come out that we can produce rubber cheaply.'

A Malayan expert was recently named to take over leadership of the Government's rubber replanting schemes. He is Inche Salim Bin Mohammed Akib who succeeds Mr S. E. Chamier in the key job of chairman of the boards of administrators of the schemes. Mr Chamier is retiring in June.

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HEAD of CHEMISTRY DIVISION
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THE first modern work devoted solely to this important subject to be published in the English language. In addition to the analysis of natural and synthetic rubbers, the author deals with rubber-like plastics such as Polyethylene, PVC, PVDC, PVA and Urethanes. Also discussed are the identification of compounding ingredients used in the manufacture of rubber and rubber-like polymers.

It will unquestionably become a standard work and is a "must" for all analysts interested in this subject.

CONTENTS:

Extraction Procedures - Qualitative Analysis for Polymer Type - Elemental Analysis of Extracted Polymer - Direct Determination by Functional Group Analysis - Solution and Dissolution Methods - Quantitative Cracking and Distillation Methods - Carbon Black in Rubber - Ashing, Wet and Dry, and the Determination of Trace Metals - Analysis of Extracts and Blooms - Statistical Aspects of Analytical Work.

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Rubber Statistics

WORLD POSITION AT THE END OF FEBRUARY

THE latest Press Release issued by the Secretariat of the International Rubber Study Group sets out the world rubber position at the end of February. The following preliminary figures, which are expressed in 1,000 long tons, compare the position at the end of February 1959 with that obtaining a year previously.

	Natural Rubber		
	Feb. 1959	Jan./Feb. 1959	Jan./Feb. 1958
Production	130.0	297.5	267.5
Consumption	165.0	357.5	307.5
		Change since Jan. 1 1959	
Stocks at Feb. 28:			
In producing areas		275.0	—20.0
In consuming areas		225.0	+ 7.5
Afloat		197.5	—27.5
		697.5	—40.0

As was the case during the early part of last year, production of natural rubber is running at a very much lower rate than consumption, and this is further borne out by recent movements in the price. The February consumption figure includes estimated imports into Russia of 14,750 tons and imports into China of 8,000 tons. Up to the end of February, 35,250 tons are estimated to have been imported by Russia and 26,750 tons by China, giving a combined total of 62,000 tons which represents approximately one-sixth of the world consumption total during that period.

Synthetic Rubber

The synthetic rubber position during this period is set out in the following table:

	Synthetic Rubber		
	Feb. 1959	Jan./Feb. 1959	Jan./Feb. 1958
Production	118.0	242.5	207.0
Consumption	120.0	242.5	192.5
		Change since Jan. 1 1959	
Stocks at Feb. 28		255.0	—

US General Position

The United States Department of Commerce has issued the following preliminary statistics for the month of March:

Natural Rubber

Consumption: 51,991 tons of which latex 7,052 tons.

Stocks: 78,871 tons of which latex 9,375 tons.

	Synthetic Rubber		
	Production	Consumption	Stocks
S-type	91,847	78,792	146,971
Butyl	6,056	5,687	14,441
Neoprene	9,690	7,444	14,701
N-Type	3,784	3,166	7,753
	111,377	95,089	183,866

Total new rubber consumption during March amounted to 147,080 tons, compared with a total of 136,141 tons in February. Natural rubber accounted for 35.35% of total consumption in March as against 34.78% in February. During the first three months of last year, the United States consumed 320,394 tons of natural and synthetic rubber combined, compared with a total for the first quarter of this year of 422,770 tons, this representing an increase of the order of 32%.

United Kingdom

Details are now available of the UK rubber position at the end of February.

Consumption of natural rubber during February, which was a four-week period, amounted to 13,756 tons, giving a weekly average of 3,439 tons compared with the January average of 3,054 tons. February consumption of natural rubber brought the total for the first two months of the year to 29,030 tons, compared with 31,378 tons consumed during the first two months of last year.

Synthetic rubber consumption during February amounted to 5,700 tons, giving a weekly average of 1,425 tons, as against 1,169 tons in January. The total for synthetic rubber consumption up to the end of February was 11,544 tons, compared with the previous year's figure of 10,398 tons.

Stocks of natural rubber on hand at the end of February stood at 33,825 tons, of which 5,988 tons consisted of latex. Manufacturers held 20,330 tons of this total, while 13,495 tons were in public warehouses. Synthetic rubber stocks stood at 12,111 tons and stocks of reclaim at 3,256 tons.

'Murine' Eye Lotion is now on the market in this country packed in a flexible 'Poly - Tainer' polythene bottle made by the Plastics Group of The Metal Box Company. An interesting feature is the polythene dropper which is specially designed so that, however hard it is pressed, it continues to dispense drop by drop and does not jet

TYRES FOR FAST MOTORING

General facts have been published this week by the Tyre Manufacturers' Conference Ltd. The notes anticipate the coming into use of the new British motorways and acknowledge the increasing number of motorists who take their cars on to fast Continental roads.

It is stated that a normal car tyre in good condition and inflated to its recommended normal pressure and operating within its load capacity, can safely be used at prolonged speeds up to 80 mph. A similar tyre can run intermittently at higher speeds than this (say up to 90 mph) but if these higher speeds are to be sustained, an increase of inflation pressure of about 6lb. per sq. in. above normal is necessary. This measure is to minimize the internal heat induced in the tyre by high speed operation.

There follows a general guide to the types of tyres and inflation pressures which should be used for cars with various maximum 'designed' speeds. In a note on remoulded tyres, it is stated that if a motorist intends to indulge in high speeds he should fit first tread tyres.

Canadian Rubber Association

J. P. Anderson, president and general manager of Dunlop Canada, Ltd. has been re-elected president of the Rubber Association of Canada. Other officers elected are: C. E. Joslin, Sherbrooke, Que., vice-president; W. H. Mason, Toronto, treasurer; Greig B. Smith, Toronto, manager and secretary.

Other members of the board of directors are: R. H. Mallory, Leaside, Ontario; T. M. Mayberry, Hamilton; John Miner, Granby, Quebec; J. B. Prendergast, Toronto; Lt. T. Rosser, Barrie, Ontario; L. E. Spencer, New Toronto; C. C. Thackray, Montreal; R. V. Yohe, Kitchener, Ontario.

Columbian International

The price of Columbian International Hi-Sil 233 has been reduced and the material delivered from the company's stores at Isleworth, Middlesex, and Liverpool, will be invoiced at £113 10s. per ton.

The Indonesian Minister for Agrarian Affairs, Mr Sunargo, said over the weekend that of all the foreign plantation firms in Sumatra only one, the American Rubber Co., had applied for an extension of its concession period.

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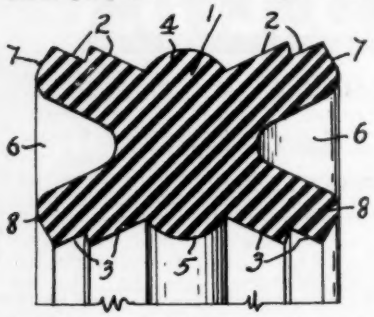
PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 3s. 6d. per copy (including postage).

Sealing or Packing Ring

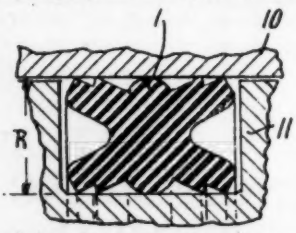
No. 810,625. Parker-Hannifin Corporation. Application and Filed, September 28 1956. Application in USA, October 4 1955. Published, March 18 1959.

As shown in the cross-sectional view in Fig. 1, a sealing or packing ring 1 has oppositely facing pairs of relatively sharp ridges 2 and 3 of generally saw-tooth form around the outside and inside peripheries of the ring and an



intervening rounded rib 4 and 5 between each pair of ridges. The opposite ends of the sealing ring are preferably recessed as at 6 to provide outer and inner flexible lips 7 and 8. These lips are easily flexed radially apart to bring the sharp edges of the ridges 2 and 3 into fluid-tight sealing engagement with the concentric walls of the chamber in which the sealing ring is placed, as in Fig. 2, in which the ring forms a fluid-tight seal between the two members 10 and 11, either one of which may be stationary and the other movable.

The sharp sealing edges of the ridges 2 and 3 are dimensioned to be flexed or deformed radially to a greater extent than is the portion of the ring between the rounded ribs 4 and 5. In this way, a fluid-tight joint is assured while fric-



tional drag in a rotary or reciprocatory joint is at a minimum because of the essentially line contacts of the ridges 2 and 3 and of the low-pressure, narrow surface contacts of the rounded ribs 4 and 5 with the concentric walls of the chamber in which the ring is inserted. To prevent any tendency of the ring to turn or twist during relative axial movement of the member which carries the ring and the member with which it is slidably sealed, the radial cross-section of the ring, as shown in the drawings, is bounded by a rectangle in which the dimension in the axial direction is greater than in the radial direction. The ring is made of synthetic rubber or a flexible plastic such as polythene.

Price Changes

Philblack Ltd. have reduced prices for Philblacks 'A,' 'O,' 'I,' and 'G,' effective for deliveries from works or store. Prices are in pence per lb.

	Ex works Avonmouth Min. 3-ton lots	Ex works Avonmouth Lots less than 3 tons	Ex store London, Glasgow and Elton, Bury
Philblack:			
'A' F.E.F.	7½	7¾	8¼
'O' H.A.F.	8	8¼	9
'I' I.S.A.F.	10½	10¾	11½
'G' G.P.F.	7¼	7⅜	8⅛

The prices for Philblack 'E' remain unchanged.

Prices of the following grades of carbon black produced by Cabot Carbon Ltd. have been reduced and are as follows:

	Pence per lb., ex works
Vulcan 3 HAF	8
Vulcan 6 ISAF	10½
Vulcan XXX SCF ..	17½
Sterling SO FEF	7½
Sterling V GPF	7⅛

The above prices apply to minimum 3 ton lots. Smaller quantities would be ¼d. per lb extra.

Wilfrid Smith Ltd., in association with Hubron Rubber Chemicals Ltd., have announced a reduction in the prices of Ukarb 327 and Ukarb 340. The new prices which became effective on May 15 are:

	Pence per lb., ex works
Ukarb 327	
1-ton lots in one delivery..	7¾
3- ,, ,, ,, ,, ,, ..	7⅛
	ex London Store
Quantities under 1 ton ..	8⅛
	ex Manchester Store
,, ,, 1 ,, ..	8⅛
Ukarb 340	ex works
Minimum 1-ton lots ..	8
	ex London Store
Smaller quantities ..	9
	ex Manchester Store
,, ,, ...	9

Plastics Materials in 1958

SALES AND EXPORTS HIGHER

BOARD of Trade figures issued on May 20 show that net sales of plastics materials in 1958 at 416,000 tons were over 22,000 tons, or 6% higher than in 1957. The rate of expansion was considerably less than in 1957 when sales rose by 17% as compared with 1956, but was comparable with the increase of 7% between 1955 and 1956. After an increase of nearly 8% in the first quarter of 1958 as compared with a year earlier there was a distinct check in the second quarter when net sales were at virtually the same level as in the corresponding period of 1957, although production remained high with a building up of stocks. In the third quarter net sales were slightly higher than a year earlier, but in the last quarter of the year they showed a marked recovery, both in home and export markets (with exports rising to a record level of 34,000 tons).

Total exports in 1958 (excluding plastic waste and scrap) were nearly 115,000 tons, almost 9% higher than in 1957. Imports also increased sharply to over 41,000 tons, about 24% higher than in the previous year, largely accounted for by OEEC countries.

NET SALES OF PLASTIC MATERIALS

(*Thousand tons*)

	1957	1958
Thermosetting Materials:		
Alkyds	43.5	44.7
Aminoplastics ..	50.5	49.9
Phenolics and cresylics	66.7	65.4
Polyesters	3.2	4.7
Other*	6.4	6.3
Total thermosetting	170.2	171.0
Thermoplastic Materials:		
Cellulose plastics ..	12.3	11.6
Polyvinyl chloride† ..	66.2	73.3
Polystyrene	31.1	33.2
Other‡	113.4	126.6
Total thermoplastic	223.0	244.6
Total, all Plastics Materials	393.1	415.6

Any apparent discrepancies are due to rounding of figures. * Including epoxide resins and casein plastics. † Excluding sales of resins (*i.e.* polymers sold as such). ‡ Including acrylics, polyamides, polytetrafluorethylene, polyethylene, polyvinyl chloride resins (*i.e.* polymers sold as such), polyvinyl acetate.

USSR Buys UK Glass Fibre

A substantial 'sample' order has been placed by Russia with Glass Yarns and Deeside Fabrics Ltd., Camberley, Surrey. The company says there is every prospect of very big orders to follow.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THE buying of top grade industrial ordinary shares has continued on a fairly heavy scale in the past two weeks or so. The demand has been general rather than particular. This trend would appear to stress the fact that investors at large believe the political situation has taken a turn for the better and that there is still a considerable way to go before the top in the present 'bull' phase is reached. Whether or not the present pace can be maintained is entirely another matter, certainly the stage has been reached when a weeding out of the speculators in several sections of the market would be a welcome event.

The degree of speculation involved in the plastics and rubber manufacturing groups of share markets is, fortunately, at a minimum at the present time. There are, of course, several rumours in circulation regarding the shares of a chemical group and a concern in the consumer end of the plastics trade but these rumours are very vague and the speculation is not going to be increased by reference in this column.

Two of the leading companies referred to in our list of share quotations have recently issued their full reports. The DUNLOP RUBBER group came out with what must be one of its most pleasing sets of accounts for several years. The sales level showed a further rise of around 5% to £243 million. However, as is so often the case these days the full benefit of the increase in turnover was whittled down by rising costs and increasing competition. The actual group net profit shows a rise of some £770,000 at £5,797,000 and the dividend (as already mentioned) is being lifted from 14% to 16¼%.

The full report although receiving a very good reception from the National Press did not excite investors. After its release the ordinary shares remained a quiet market at around 29s. 1½d.

The most important disclosure in the full report of the BRITISH XYLONITE concern is that the directors are continuing with their policy of expansion in the face of what appears to be increasing competition and declining margins.

The turnover of this group in the year just ended showed a gain of £1,000,00 at £12,000,000 but once again this increase has not been reflected in profits. These were down by more than 6%. The concern expended more than £850,000 on capital account for the year just ended which is considerably in excess of the amount set aside in previous years. The commitments outstanding are given in the balance sheet as £303,000 against £239,000 last time. Despite the fall in profits which have been known for some time now, the market is still optimistic about the long-term outlook for this company and there has been steady support for its shares.

The demand for the ordinary shares of the ALBRIGHT AND WILSON concern has been a little more than 'steady.' Since the last week in April the share quotation has gained around 5s. to a new high of 26s. 9d. This buying really reflects a widely held City view that the company has a really sound long-term potential. There has been renewed demand for DANNIMAC ordin-

Continued on page 842

Share Price Movements

Par Value	Company	1958-59 High	Low	May 16	Latest
5/-	Albright & W. Ord. ..	26/9	13/4½	24/6	26/6
£1	„ „ „ 5% Pref...	16/7½	15/4½	16/3	16/3
5/-	Anchor Chemical Ord...	14/–	10/3	13/–	14/–
5/-	Andersons Rub. Ord. ..	4/3½	3/–	3/1½	3/3
2/-	Anglo-Amer. Vulc. Fibre Ord.	4/3	2/–	3/3	3/3½
£1	Angus Geo. Ord. ..	29/10½	21/–	25/7½	27/3
5/-	Armitage (Sir Elk.) Ord.	4/10½	2/3	4/6	4/6
5/-	Ault & Wiborg Ord. ..	16/3	11/9	14/9	15/10½
£1	Avon India Rubber Ord.	42/–	27/–	40/–	40/–
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	18/3
10/-	Bakelite Ord.	28/3	17/–	26/10½	28/–
£1	„ 6% Pref. ..	19/6	18/3	18/3	18/3
£1	Baker Perkins Ord. ..	47/–	30/7½	43/9*	47/–
4/-	Bank Bdg. Rubber Ord.	2/7½	1/6	2/–	2/–
5/-	Boake (A.) Roberts Ord.	18/6	9/–	13/4½	13/–
£1	„ „ „ 5% Pref.	15/1½	13/9	13/9	13/9
4/-	Brammer H. Ord. ..	—	—	18/3	11/6†
5/-	Bridge, David Ord. ..	28/6	16/3	28/–	28/3
5/-	Bright, John Ord. ..	13/10½	8/9	11/–	11/–
2/-	Brit. Ind. Plas. Ord. ..	8/1½	4/9	7/6	7/9
2/-	„ 10% (tax free) Pref.	5/9	4/8½	4/9	4/9
£1	British Xylonite Ord. ..	57/9	28/6	55/7½	56/6
£1	„ „ 5% Pref.	15/9	14/–	15/7½	15/7½*
5/-	BTR Ind. Ord.	13/3	9/4½	10/3	10/3½
£1	„ „ 7½% Pref. ..	22/6	20/9	22/6	22/6
£1	Courtaulds Ord... ..	36/3	20/–	35/–	36/–
£1	„ 5% 1st Pref.	18/6½	15/7½	16/9	16/3*
£1	„ 6% 2nd Pref.	19/6	17/1½	19/6	19/6
4/-	Cow, P. B. Ord. ..	6/7½	3/6	6/–	6/–
£1	„ 5% Pref. ..	13/9½	10/9	13/9	13/9
5/-	Dale, John Ord... ..	16/6	10/–	13/6	16/3
£1	„ „ 6% Pref. ..	16/–	13/–	15/10½	16/–
1/-	Dannimac Mfg. Ord. ..	7/6	2/6	6/–	7/6
10/-	De La Rue Ord. ..	36/–	20/9	35/6	35/10½
£1	„ „ „ 3½% Pref. ..	11/9	10/–	10/3	10/9
6/8	Distillers Co. Ord. ..	27/–	15/9	26/3	27/–
£1	„ „ 6% Pref...	21/7½	19/10½	21/6*	21/6
£100	„ 5% Conv. Loan	£96½	£91	£94*	£93
£100	„ 5½% Unsec. Loan	£94	£87 7/16	£94*	£93
10/-	Dunlop Rubber Ord. ..	29/10½	14/9	29/3	29/1½
£1	„ 5½% Pref.	18/9	15/10	17/6	17/6
£100	„ 3½% 1st Debs.	£75½	£67½	£75½	£75
£100	„ 4½% 2nd Debs.	£82½	£78	£82½	£82½
4/-	Ebonite Cont. Ord. ..	15/3	7/6	13/10½	13/9
£1	English China Clays Ord.	63/–	29/9	59/4½	62/10½

Par Value	Company	1958-59 High	Low	May 16	Latest
£1	Goodyear Tyre 4% Pref.	12/9	12/–	12/6	12/6
5/-	Greeff Chem. Ord. ..	17/9	14/–	17/–	17/6
10/-	„ „ 5½% Pref...	8/–	7/9	8/–	8/–
4/-	Greengate & Irwell Ord.	7/0½	4/9	5/6	5/9
£1	Harrisons & Crosfield Dd.	61/3	43/9	58/9	56/3
1/-	Hunt & Moscrop Ord. ..	1/5	1/1½	1/3	1/3
£1	Imp. Chem Ord. ..	38/–	28/3	34/4½	34/7½
£1	„ „ 5% Pref. ..	17/3	16/–	17/–	17/–
£100	„ 4½% Unsec. Loan	£88½	£80	£87	£88
£100	„ 5½% Conv. Loan	£121	£99	£117	£119
1/-	Kleemann (O. & M.) Ord.	5/5½	2/6	5/3*	5/3
£1	„ „ 6½% Pref.	16/9	15/–	16/7½	16/6
2/-	Lacrinoid Prod. Ord. ..	2/5½	1/5½	2/–	2/–
5/-	Laporte Ind. Ord. ..	24/7½	13/7½	24/6	25/3
£1	„ „ 7½% Pref.	22/10½	21/10½	22/9	22/9
£1	Leyland & Birm. Rubber Ord.	—	—	52/6	51/3
£1	„ „ 6% Pref.	21/3	16/1½	*16/10½	16/10½
2/-	London Rubber ..	14/7½	8/6½	14/6	16/10½
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9
£1	McKechnie Bros. Ord.	45/–	32/6	42/6*	41/3
£1	„ „ 'A' Ord.	44/6	30/–	38/3*	39/9
£1	„ „ 6% Cum. Pref.	17/–	16/–	17/–	17/–
5/-	Monsanto Chem. Ord. ..	16/4½	13/–	16/–	16/–
£1	„ „ 3½% Pref.	13/–	11/–	13/–	13/–
£100	„ 6% Debs.	£104	£101½	£104	£104
£1	North British Rubber ..	—	—	15/3	15/6
5/-	Redfern Holdings Ord. ..	3/7½	2/10½	3/6	3/6
2/-	RFD Ltd. Ord.	6/6	3/5½	6/3	5/6*
£1	„ „ 5½% Pref. ..	14/9	11/6	14/9	14/9
2/-	Rubber Imp. Ord. ..	15/6	4/9	5/6	5/6
2/-	„ „ 'A' Ord.	14/3	4/6	5/–	5/–
£1	„ 5% 1st Pref.	12/3	10/–	10/–	10/–
5/-	Rubber Reg. Ord. ..	13/–	10/6	10/7½	12/6
4/-	Shaw Francis Ord. ..	18/–	9/9	16/7½	17/3
2/-	Silentbloc Ord. ..	9/2½	7/6	8/–	9/–
2/-	Sussex Rubber Ord. ..	1/9	7½	1/4½*	1/9
5/-	Sutcliffe Speak Ord. ..	7/4½	5/–	7/–	7/–
£1	Turner & Newall Ord. ..	76/4½	52/–	71/10½	72/3
£1	„ „ 7% Pref.	24/–	22/1½	22/7½*	23/3
5/-	Universal Asbestos Ord.	21/–	8/0½	20/–	20/6
5/-	Viscose Dev. Ord. ..	10/7½	6/3	10/0½*	10/3
5/-	Warne William (Holdgs.) (Ord.	12/9½	8/–	12/3	12/9

*Ex-dividend †Ex-all

Rubber Markets

LONDON

Prices in the London rubber market have continued their recovery during the past week and gains of ⅜d. to ⅝d. have been scored with the larger gains among the distant positions. The recovery reflects the recent statement that any decision to reduce the US stockpile could not become effective until 1961. The improvement has been assisted by short covering and a reported developing shortage of nearby supplies in New York.

Latest prices are as follows:

No. 1 RSS Spot: 29⅞d.-30⅛d.

Settlement House :

July/September 30⅛d.-30⅜d.

October/December 30⅛d.-30⅜d.

January/March 29⅜d.-30d.

April/June 29⅜d.-29⅞d.

No. 1 RSS cif basis ports:

June 29⅞d.-30⅛d.

July 29⅞d.-30⅛d.

Godown:

June 102⅞ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, June/July shipment, 17s. 11d. seller, cif European ports. Spot, seller, 18s. 4d. Bulk, seller, 17s. 8d. Creamed, seller, 17s. 6d. Normal, seller, 13s. 4d.

AMSTERDAM

The Amsterdam rubber market ruled as under on May 25:

No. 1 RMA	Guilders per kilo May 25	Previous
May	2.92	2.92
June	2.92	2.92
July	2.92	2.92
August	2.92	2.92
September	2.92	2.92
July/September ..	2.95½	2.93
October	2.92	2.92
November	2.93½	2.92

Sales: Nil. Tendency: Very steady

DJAKARTA

In rather quiet dealings on May 25, fair interest was noted in rubber for ready and nearby delivery. Turnover was small.

	Rupiahs per kilo May 25	Previous
Spot No. 1 Priok ..	28.10b	27.75b
Spot No. 2 Priok ..	27.25b	27.00b
Spot No. 3 Priok ..	26.50b	26.25b
No. 1 fine pale crepe	26.50b	25.25b

Tendency: Quiet

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on May 25 was 34.12½ (33.87½) US cents per lb.

NEW YORK

The following prices ruled in New York on May 25:

DEALERS' PRICES

	US cents/lb., ex-dock May 25	Previous
No. 1 RSS, June	36⅜b–36⅝a	36⅜b–36⅝a
July	36⅜b–36⅝a	36⅜b–36⅞a
No. 2 RSS, June	36⅜b–36⅝a	36⅜b–36⅝a
July	36⅜b–36⅝a	36⅜b–36⅝a
No. 3 RSS, June	36b –36¼a	36⅛b–36⅜a
July	36b –36¼a	36⅛b–36⅜a
No. 1 RSS Spot	36⅜b–36⅝a	36⅜b–36⅞a
No. 3 amber blanket crepe, Aug.	34⅞b–35a	34⅝b–34⅞a
No. 1 latex, thin crepe, June ..	36⅛n	36⅜n
No. 1 latex, thick crepe, June ..	36⅛n	36⅜n

FUTURES—REX CONTRACT

	Close	Prev. Close
May ..	36.75b–37.75a	36.75b–37.85a
July ..	37.01b–37.25a	37.30b–37.35a
Sept. ..	36.30t	36.50b–36.65a
Nov. ..	35.95t	36.15b–36.25a
January ..	35.45b–35.65a	35.75b–35.90a
March ..	35.00b–35.20a	35.40b–35.55a
May ..	34.80b–35.00a	35.20b–35.40a

Sales: 58. Tendency: Easier

Rubber futures were steadier on May 25 in early dealings aided by the steady tone of foreign markets but slipped later when the buying interest subsided. Traders said factories bought a fair amount of physical rubber earlier but then withdrew. A fair volume of shipment offerings was reported but some unsold rubber was noted later in the market.

SINGAPORE

The market was marked up at the opening on May 25 on improved New York advices and ruled quiet throughout with fluctuations negligible. There was small interest in lower grades but sellers were reserved. Factories were small buyers. The afternoon was very quiet with little change in prices. There was some small enquiry for physicals but for the most part sellers were reserved. After-hours, the market was quiet.

	Straits cents per lb., fob Malayan ports to open ports Close	Previous Close
No. 1 RSS, June	104⅜–105	103⅜–103⅞
July	104⅛–105	103⅛–103⅞
No. 2 RSS, June	103 –103⅜	102⅛–102⅝
No. 3 RSS, June	102½–103	101¼–102
No. 4 RSS, June	101⅜–102½	100½–101½
No. 5 RSS, June	100½–100½	99½– 99¾
No. 1 Spot ..	104¼–104⅜	103½–103⅝
No. 3 blanket, thick remilled, June	98 –100	97½– 99½
No. 1 fine pale crepe, June ..	106½–108½	106 –108
Thin brown crepe, June	99½–100½	98½– 99½

Tendency: Quiet

The Industrial Syndicate quote latex, native produce, 60% centrifugal, packed in rec. drums fob at 205.80d. per gallon.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on May 25 was 135 (133) Ceylon cents per lb.

STOCK MARKET

Continued from page 841

ary shares on talk of increasing consumer interest in the company's products.

The shares of the RFD group suffered a set-back following news of an unchanged dividend of 17% for the year to December last. The optimists had been going for a fairly large increase in the payment, so jobbers took the precaution of lowering the price from 6s. 3d. to 5s. 6d. after the news. Group profits came out at £119,000 compared with £135,000.

LACRINOID PRODUCTS ordinary shares, which are not an active market at any time, were steady at around 2s. after the news of a final dividend of 10% which is double the previous year's total.

The performance of the ordinary shares of the JOHN DALE concern is causing some comment in and around the City. A few weeks ago the company announced a fall in profits from around £140,000 to £86,000, the dividend was cut back from 16⅔% to 11%. One would have thought that this news would have at least caused a sharp reaction in the shares. Reaction there was, but it was only a minor affair and the buyers moved in immediately. Since then the demand has shown no signs of contracting, if anything the reverse is true.

The chairman has already stated that the decline in profits has been arrested and that the management structure has been reorganized. Results for the early months of this year show an improvement and there are obviously grounds for believing that this recovery will continue.

Nigeria Welcomes Rubber Planters

Establishment of rubber plantations in Western Nigeria by foreign investors either in partnership with private people or statutory corporations of the government would be welcome in the region, according to the region's Minister of Trade and Industry, Chief A. O. Adeyi.

The Minister gave this assurance to members of the United States Trade Mission in Ibadan. He also explained that where government went into partnership with private investors, it would ultimately hand over as soon as it was able to sell its share to private individuals.

Industry INTELLIGENCE

Technical Data

Blends of Nitrile Rubber and PVC

The incorporation of up to 30% of PVC in nitrile rubber stocks gives vulcanizates which retain the oil-resisting properties of nitrile rubber and possess in addition excellent resistance to ozone. Data for the properties of such blends, termed polyblends, are given in Technical Note No. H212 issued by British Geon Ltd., Devonshire House, Piccadilly, London, W.1.

The nitrile rubber used was Hycar 1042 and this was blended with the PVC resins 113 or Geon 121 in a proportion of 70 parts of Hycar to 30 parts of PVC. Any Hycar polymer can be used but Hycar 1042 presents the best compromise between good oil resistance and flexibility at low temperature. Geon 113 or 121 give the most suitable PVC component when used as a 20% to 30% replacement for the nitrile rubber. Maximum physical properties of the vulcanized material can only be achieved by fluxing together the PVC and the nitrile rubber. When internal mixing is employed, this can conveniently be accomplished during the mixing cycle, since a sufficiently high temperature (149°C.) for this action is usually obtained. If the compound is mixed on a mill, it is necessary to flux the blend for 5 to 10 minutes at 138 to 149°C. before addition of the fillers. Data are given for the properties of the vulcanizates before and after ageing under various conditions together with results of an ozone test, a polychloroprene compound being included for comparison. The polyblends are of particular interest for the car industry and for the cable and wire industry.

Stabilizers for PVC

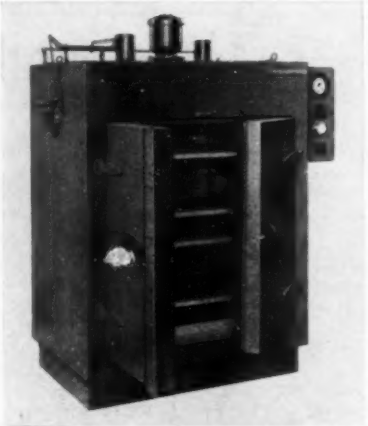
Data for the properties of six lead stabilizers for PVC and information on their use are given in a folder issued by Novadel Ltd., St. Ann's Crescent, London, S.W.18. The stabilizers are basic lead carbonate, lead stearate, dibasic lead stearate, dibasic lead phosphite, tribasic lead sulphate and lead silicate. Incorporation of lead stabilizers into PVC compounds should be effected by predispersing the stabilizer into a portion of the plasticizer being used or into a portion of the resin or paste resin. The particle size of the lead stabilizers is such that they are readily predispersed in this way, although the operation requires care, experience and adequate facilities. The commonly used plasticizers are dioctyl phthalate, certain other phthalates and trixylyl phosphate. In calculating the amount of a lead stabilizer to be used in a PVC compound, it is necessary to know the amount of lead in the stabilizer safely available for reaction with hydrochloric acid and figures for the 'safely available' lead in the six lead stabilizers are therefore given in the folder. The toxicity of lead stabilizers renders them unsuitable for use in PVC products which come into contact with foodstuffs or which are used in children's toys.

Another Novadel stabilizer for PVC is Estabex Z-20 which chemically is zinc octoate. The properties and application of this stabilizer are described in a leaflet. Zinc octoate has no stabilizing effect by itself but it gives good results when used in conjunction with barium and calcium soaps and with epoxy compounds. It is stated to be non-toxic and some formulae are given for PVC compounds containing Estabex Z-20 which are believed to be suitable for making containers for food products.

Machines, Materials and Equipment

Industrial Ovens

A new comprehensive range of Barlow-Whitney gas-fired tray loading industrial ovens, with a choice of either vertical or horizontal forced air circulation, or natural convection, and of direct or indirect firing, has been introduced by Barlow-Whitney Ltd., of 2 Dorset Square, London, N.W.1. Standard sizes range from eight to 72 cu. ft.



Barlow-Whitney gas-fired industrial oven with a choice of direct or indirect firing, and either vertical or horizontal forced circulation, or natural convection

capacity, and all units incorporate the latest safety features recommended by the gas council and HM Factory Inspectorate including explosion reliefs and flame failure device. Automatic temperature control is also a standard feature, and this together with the low-heat-loss factor, resulting from rigid double-skin construction and generous insulation, ensures consistent performance and high operating efficiency for the very many diverse heating processes for which tray loading ovens are necessary, including: baking, curing, drying, pre-heating, stoving, vulcanizing, etc. The range covers four types.

Rubber Reinforcing Resin

A new electrical grade rubber reinforcing resin designed to meet requirements of the electric wire and cable industry, Pliolite S–6E, has been developed by the Chemical Division of The Goodyear Tyre and Rubber Company, Akron, Ohio, USA.

A high styrene-butadiene resin, Pliolite S–6E is said to exhibit exceptional processability and makes possible production economies since it disperses readily on a mill or in a banbury mixer. Inclusion in rubber stocks increases hardness, stiffness, flex life and abrasion resistance. The new resin has a softening point well within the range of normal processing temperatures.

Laboratory evaluation of test formulations utilizing Pliolite S–6E showed a volume of resistivity of 5.62 ohms/cm. 10–14 at 77°F. In addition to electric wire and cable applications, the new reinforcing resin is suggested for use in light or dark rubber stocks requiring high electrical resistance and/or low water absorption properties.

Publications Received

'Formulas and Tables for Polythene Film and Bags'

In an effort to meet the packaging industry's need for an easy, yet accurate method of computing polythene bag and film measurements, the US Industrial Chemicals Co. has developed a series of convenient formulas and tables. Complete details of this system are contained in a new technical bulletin, 'Formulas and Tables for Polythene Film and Bags,' published for use by both extruders and converters. A wide variety of computations can be made with the USI formulas. Formulas are laid out in an easy-to-follow manner for determining: feet obtainable per lb. of film; weight per 1,000ft. of film; weight per roll of film; average gauge of film; weight per 1,000 bags; bags per lb. of film; and average gauge of bags. The USI formulas take into account such variations as film width, gauge, and density. Conversion tables to change from the US customary standards to the metric system are presented along with sample problems. For rapid answers to a number of questions, four tables are included in the bulletin. These give feet per lb. of film, weight per roll, weight per 1,000 bags, and number of bags per lb. Thus a whole range of information is obtainable at a glance.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

DRISTIC (B771,339) For non-metallic tiles. By Porosan Plastics Ltd., 103 Cannon Street, London, E.C.4. (Class 19; April 15 1959.)

GROTHENE (785,068) For polythene plastics included in Class 17 in the form of sheets, films and tubes. By British Cellophane Ltd., Bath Road, Bridgwater, Somerset. (Class 17; April 15 1959.)

DECPOL (784,482) For polyester resin lacquer for use on furniture. By F. Wrighton and Sons Ltd., Brampton Works, Billet Road, Walthamstow, London, E.17. (Class 1; April 22 1959.)

SANTOVAR (776,106) For chemical compounds for use in the manufacture of rubber and imitation rubber. By the Monsanto Chemical Co., 800 North Lindbergh Boulevard, St. Louis, Missouri. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. To be associated with No. 659,766 (3697, 140) and another. (Class 1; April 22 1959.)

LIQUIBOR (784,453) For chemical products for use in science and industry; chemical products included in Class 1 for use in agriculture and horticulture; fire-extinguishing, flame proofing and anti-freeze preparations; chemical preparations for use in increasing the stability of substances undergoing changes in temperature; tempering substances, chemical preparations for soldering; and synthetic resins for use in manufacture. By Borax Consolidated Ltd., Borax House, Carlisle Place, London, S.W.1. (Class 1; April 22 1959.)

TERMOPOCHE (772,538) For containers included in Class 16 made principally of paper or of paper board or of combinations of paper or of paperboard with metallic foil and films of thermoplastics. By the Organization Internationale du Thermosac, SC, 71 Forelstraat, Ghent, Belgium. Address for service is c/o Bromhead and Co., St. Paul's Chambers, 19/23 Ludgate Hill, London, E.C.4. (Class 16; April 22 1959.)

PERMACAST (782,758) For plastics reinforced with powdered or fibrous materials, the plastics predominating, being goods in the form of sheets, strips, slabs, blocks, rods, pipes, tubes and of shaped sections, all included in Class 17; and materials for packing (jointing) and insulating. By Permali Ltd., 125 Bristol Road, Gloucester. To be associated with No. 618,068 (3381, 17) and others. (Class 17; April 22 1959.)

NEW COMPANIES

V. Dobson Products Ltd. (623,091).—March 13. Capital: £100 in £1 shares. To carry on the business of dealers in, agents, distributors for and manufacturers, merchants of plastic substances and materials of all kinds, etc. The directors are: Vincent H. Dobson, 24 Colin Crescent, London, N.W.9; Nicholas St. G. Wise, 54 Rose Glen, London, N.W.9. Regd. office: Number 4 Factory, Goodwin Road, Edmonton, London, N.9.

Vanroy Ltd. (623,315).—March 17. Capital: £10,000 in £1 shares. To carry on the business of mechanical, constructional, chemical refrigeration, mining, ceramic, plastic and general engineers, etc. The directors are: John Bates, 34 Whitmore Road, Trentham, Staffs.; John Arrowsmith, The Old Vicarage, Hales, Market Drayton. Solicitors: Kent, Jones and Done, Alsager.

Dumo Fiori (Torino) Ltd. (623,322).—March 17. Capital: £100 in £1 ordinary shares. To carry on the business of importers and distributors of artificial flowers and plants made from plastic polythene or other materials, containers, packages and packing materials, fancy goods, novelties, toys, etc. The directors are: Miss Marjorie Green, 7a Alan Road, Wimbledon, S.W.19; Mrs. Corinne Grundy, 30 Finch Road, Berkhamstead, Herts. Regd. office: 147a High Street, London W.8.

Tyremasters Ltd. (624,261).—March 26. Capital: £5,000 in 100 ordinary and 4,900 preference shares of £1. To carry on the business of dealers in tyres, etc. Regd. office: 77/79 King Street, London, W.6.

'Akulon' (nylon) is now being used by the British Post Office for this operator's head telephone set, which is coded by the GPO as headset No. 1. 'Akulon' is supplied by BX Plastics Ltd., who are the sole agents for the British Isles, and the moulding is carried out by Kent Mouldings Ltd. for Standard Telephones and Cables Ltd.

PATENT LIST

Printed copies of the Specifications in the following list can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on May 21 1959

Dow Chemical Co. Ethers of polyoxyalkylene glycols. 813,495.

Eastman Kodak Co. Catalytic polymerization of α-monoolefins such as ethylene to solid polymers. 813,798.

General Electric Co. Organosilicon compounds. 813,520.

R. T. Vanderbilt Co. Inc. Chloroprene polymers containing a pyrimidine accelerator. 813,779.

Shell Research Ltd. Viscometers. 813,735.

Owens-Corning Fiberglas Corporation. Coated glass fibres. 813,602.

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Increases of Capital

Fasweld Ltd. (523,945), plastic manufacturers, etc., Grenofen House, Grenofen, Tavistock, Devon. — Increased by £4,900, in £1 ordinary shares, beyond the registered capital of £2,000.

MacGentle Ltd. (244,496), tyre factors, etc., of 60 New Bedford Road, Luton.—Increased by £7,800, in £1 ordinary shares, beyond the registered capital of £200.

Kleeman Plastics Ltd. (595,828), West Halkin House, West Halkin Street, S.W.1.—Increased by £432,900, in £1 ordinary shares, beyond the registered capital of £100.

Sewell and King Ltd. (279,267). Manufacturers of, and dealers in, rubber tyres, tubes, belts, etc., 38 Poole Road, Westbourne, Bournemouth.—Increased by £8,000 in £1 ordinary shares, beyond the registered capital of £2,000.

A. Wilson's Stores (Holdings) Ltd. (110,852), formerly Morib Plantations Ltd. Acquired shares, etc., 200 Gresham House, Old Broad Street, E.C.2.—Increased by £230,000 in 2s. shares, beyond the registered capital of £70,000.

Brooklands Selangor Rubber Co. Ltd. (108,735), 73/5 Mortimer Street, London, W.1.—Increased by £250,000 in 2s. ordinary shares, beyond the registered capital of £315,000.

Sterling Moulding Materials Ltd. (445,609), Sterling House, 8 Heddon Street, London, W.1.—Increased by £75,000 in £1 shares, beyond the registered capital of £75,000.

Changes of Name

Frankside Ltd. (494,983), 1/5 Sugar Lane, Manchester 4.—Name changed to Plastic Warehouse Ltd. on February 2 1959.

Goodwin (Gee-Dee) Plastics Ltd. (616,325), Bank Chambers, 2 Church Road, Stanmore, Middx. — Name changed to Goodwin Plastics Ltd.

Rubber Journal and International Plastics **CLASSIFIED ADVERTISEMENTS**

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DEVELOPMENT chemist with experience of pressure sensitive adhesives or rubber technology required by a rapidly expanding paper converting company in the Manchester area. Applications marked confidential should give full details of education and experience.—Box 63. (63)

DU PONT CO. (UNITED KINGDOM) LTD. have an opening for a rubber technologist at their new elastomers research laboratory at Hemel Hempstead. The laboratory is the most modern in the UK, equipped with the latest rubber processing and testing equipment. We are looking for a man experienced in the use of elastomers in the wire and cable industry. He must be able to plan and carry out his own laboratory and technical service programmes. Minimum qualifications are a science degree and 2 years' experience in the industry. Liberal publication and meeting policy. Pension scheme. 5-day week. Apply to:—Elastomers Research Laboratory, Maylands Avenue, Hemel Hempstead, Herts. (71)

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A large rubber manufacturing company in the North require the services of a quality control manager who will be responsible to management for in process control and finished inspection. Applicants must have organising ability and be capable of accepting full responsibility for all aspects of quality control including customer contact. Candidates for this senior management position should have had experience of this work in general mechanicals preferably including hose manufacture. Contributory pension scheme, free life assurance and assistance with removal will be given. Applications giving full details of qualifications, experience and age should be addressed to:—Box 75. (75)

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DU PONT CO. (UK) LTD. has an opening for a science graduate aged 22 to 25 to act as technical sales correspondent with a view to eventual transfer to the laboratory near London or to technical sales. Some experience in rubber technology desirable but not essential. Pension scheme, 5-day week. Applications to:—Du Pont Company (UK) Ltd., 76 Jermyn Street, London, S.W.1. (72)

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SALES representative seeks similar position with progressive company. Preferably based on Manchester area.—Box 68. (68)

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